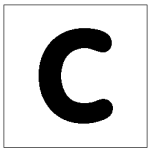


cable: 1. An assembly of one or more insulated conductors, or optical fibers, or a combination of both, within an enveloping jacket. *Note:* A cable is constructed so that the conductors or fibers may be used singly or in groups. (188) **2.** A message sent by cable, or by any means of telegraphy.

cable assembly: A cable that is ready for installation in specific applications and usually terminated with connectors.

cable jacket: *See* **sheath.**

cable cutoff wavelength (λ_{cc}): For a cabled single-mode optical fiber under specified length, bend, and deployment conditions, the wavelength at which the fiber's second order mode is attenuated a measurable amount when compared to a multimode reference fiber or to a tightly bent single-mode fiber.

cable television relay service (CARS) station: A fixed or mobile station used for the transmission of television and related audio signals, signals of standard and FM broadcast stations, signals of instructional television fixed stations, and cablecasting from the point of reception to a terminal point from which the signals are distributed to the public. [47CFR]

cable TV (CATV): A television distribution method in which signals from distant stations are received, amplified, and then transmitted by (coaxial or fiber) cable or microwave links to users. *Note 1:* CATV originated in areas where good reception of direct broadcast TV was not possible. Now CATV also consists of a cable distribution system to large metropolitan areas in competition with direct broadcasting. *Note 2:* The abbreviation *CATV* originally meant "*community antenna television.*" However, *CATV* is now usually understood to mean *cable TV.*

cache memory: A buffer, smaller and faster than main storage, used to hold a copy of instructions and data in main storage that are likely to be needed next by the processor and that have been obtained automatically from main storage.

call: 1. In communications, any demand to set up a connection. **2.** A unit of traffic measurement. (188) **3.** The actions performed by a call originator. **4.** The operations required to establish, maintain, and release a connection. **5.** To use a connection between two stations. **6.** The action of bringing a computer program, a routine, or a subroutine into effect, usually by specifying the entry conditions and the entry point.

call abandoned: *See* **abandoned call.**

call accepted signal: A call control signal sent by the called terminal to indicate that it accepts the incoming call.

call associated signaling (CAS): Signaling required for supervision of a bearer service between two end points, including support for the functions of call origination, call delivery, and handover.

call attempt: In a telecommunications system, a demand by a user for a connection to another user. *Note:* In telephone traffic analysis, call attempts are counted during a specific time frame. The call-attempt count includes all completed, overflowed, abandoned, and lost calls.

call back: [The] procedure for identifying a remote AIS terminal, whereby the host system disconnects the caller and then dials the authorized telephone number of the remote terminal to reestablish the connection. [NIS]

call collision: 1. The contention that occurs when a terminal and data circuit-terminating equipment (DCE) specify the same channel at the same time to transfer a call request and handle an incoming call. *Note:* When call collision occurs, the DCE proceeds with the call request and cancels the incoming call. **2.** The condition that occurs when a trunk or channel is seized at both ends simultaneously, thereby blocking a call. (188) *Deprecated synonym* **glare.**

call completion rate: The ratio of successfully completed calls to the total number of attempted calls. *Note:* This ratio is typically expressed as either a percentage or a decimal fraction.

call control character: One of a set of control characters used in call-control signaling. *Note:* The

signals representing call control characters may be used under defined conditions on interchange circuits other than the originating circuit.

call control signal: A member of the set of network management signals used to establish, maintain, or release a call.

call delay: 1. The delay that occurs when a call arrives at an automatic switching device and no channel or facility is immediately available to process the call. **2.** The time between the instant a system receives a call attempt and the instant of initiation of ringing at the call receiver end instrument.

call detail recording (CDR): A service feature in which call data on a specific telephone extension or group of subscribers are collected and recorded for cost-of-service accounting purposes.

call duration: 1. The time between (a) the instant a connection, *i.e.*, off-hook condition at each end, is established between the call originator and the call receiver and (b) the instant the call originator or the call receiver terminates the call. **2.** In data transmission, the duration of the information transfer phase of an information transfer transaction.

called-line identification facility: A network-provided service feature in which the network notifies a calling terminal of the address to which the call has been connected.

called-line identification signal: A sequence of characters transmitted to the calling terminal to permit identification of the called line.

called party: *Synonym* **call receiver.**

called-party camp-on: A communication system service feature that enables the system to complete an access attempt in spite of issuance of a user blocking signal. *Note:* Systems that provide this feature monitor the busy user until the user blocking signal ends, and then proceed to complete the requested access. This feature permits holding an incoming call until the called party is free.

caller ID: A network service feature that permits the recipient of an incoming call to determine, even before answering, the number from which the incoming call is being placed.

caller identification: *See* **caller ID.**

call-failure signal: A signal sent in the backward direction indicating that a call cannot be completed because of a time-out, a fault, or a condition that does not correspond to any other particular signal.

call forwarding: A service feature, available in some switching systems, whereby calls can be rerouted automatically from one line, *i.e.*, station number, to another or to an attendant. *Note:* Call forwarding may be implemented in many forms.

call hold: A service feature in which a user may retain an existing call while accepting or originating another call using the same end instrument.

call identifier: A network utility that consists of a name assigned by the originating network for each established or partially established virtual call. *Note:* When a call identifier is used in conjunction with the calling data terminal equipment (DTE) address, the call identifier uniquely identifies the virtual call.

calling frequency: A radio frequency that a station uses to call another station.

calling-line identification facility: A network-provided service feature in which the network notifies a called terminal of the address from which the call has originated.

calling-line identification signal: A sequence of characters transmitted to the called terminal to permit identification of the calling line.

calling party: *Synonym* **call originator.**

calling-party camp-on: A service feature that enables the system to complete an access attempt in spite of temporary unavailability of system transmission or switching facilities required to establish the requested access. *Note:* Systems that provide calling party camp-on monitor the system facilities until the necessary facilities become available, and then proceed to complete the requested access. Such systems may or may not issue a system blocking

signal to apprise the originating user of the access delay.

calling rate: The number of telephone calls originated during a specified time interval such as one hour.

calling sequence: A sequence of instructions together with any associated data necessary to perform a call.

calling signal: A call control signal transmitted over a circuit to indicate that a connection is desired.

call intensity: *Synonym* **traffic intensity.**

call management: 1. In telegraphy, route selection, signaling, and circuit usage and availability for a call. **2.** In universal personal telecommunications, the ability of a user to inform the network how to handle incoming calls in accord with certain parameters, such as the call originator, the time of day, and the nature of the call. *Note:* Call management is accomplished by means of information in the user's service profile.

call-not-accepted signal: A call control signal sent by the called terminal to indicate that it does not accept the incoming call.

call originator: An entity, such as a person, equipment, or program that originates a call. (188) *Synonym* **calling party.**

call pickup: A service feature of some switching systems enabling a user, by dialing a predetermined code, to answer incoming calls that are directed to another user in a preselected call group.

call processing: 1. The sequence of operations performed by a switching system from the acceptance of an incoming call through the final disposition of the call. **2.** The end-to-end sequence of operations performed by a network from the instant a call attempt is initiated until the instant the call release is completed. **3.** In data transmission, the operations required to complete all three phases of an information transfer transaction.

call progress signal: A call control signal transmitted by the called data circuit-terminating equipment (DCE) to the calling data terminal equipment (DTE) to report (a) the progress of a call by using a positive call progress signal or (b) the reason why a connection could not be established by using a negative call progress signal.

call progress tone: An audible signal returned by a network to a call originator to indicate the status of a call. *Note:* Examples of call progress tones include dial tones and busy signals.

call receiver: An entity, such as a person, equipment, or program to which a call is directed. *Synonym* **called party.**

call record: Recorded data pertaining to a single call. (188)

call release time: In communication systems, the time interval from initiation of a clearing signal by a terminal until the available-line condition appears on originating terminal equipment. (188)

call-request time: In the establishment of a connection or in the call setup, *i.e.*, placement of a call, the time from the initiation of a calling signal to the receipt of a proceed-to-select signal—such as a dial tone—by the call originator.

call restriction: A switching system service feature that prevents selected terminals from exercising one or more service features otherwise available from the switching system. (188)

calls-barred facility: A service feature that permits a terminal either to make outgoing calls or to receive incoming calls, but not both. (188)

call-second: A unit used to measure communications traffic. *Note 1:* A call-second is equivalent to 1 call 1 second long. (188) *Note 2:* One user making two 75-second calls is equivalent to two users each making one 75-second call. Each case produces 150 call-seconds of traffic. *Note 3:* The CCS, equivalent to 100 call-seconds, is often used. *Note 4:* 3600 call-seconds = 36 CCS = 1 call-hour. *Note 5:* 3600 call-seconds per hour = 36 CCS per hour = 1 call-hour per hour = 1 erlang = 1 traffic unit.

call-selection time: In the establishment of a connection or the placement of a call, the time from the receipt by the call originator of a proceed-to-select

signal (dial tone), until all the selection signals have been transmitted (dialing has been completed).

call set-up time: 1. The overall length of time required to establish a circuit-switched call between users. (188) **2.** For data communication, the overall length of time required to establish a circuit-switched call between terminals; *i.e.,* the time from the initiation of a call request to the beginning of the call message. *Note:* Call set-up time is the summation of: (a) call request time—the time from initiation of a calling signal to the delivery to the caller of a proceed-to-select signal; (b) selection time—the time from the delivery of the proceed-to-select signal until all the selection signals have been transmitted; and (c) post selection time—the time from the end of the transmission of the selection signals until the delivery of the call-connected signal to the originating terminal.

call sign: A station or address designator represented by a combination of characters or pronounceable words that is used to identify such entities as a communications facility, station, command, authority, activity, or unit.

call-sign allocation plan: The table of allocation of international call sign series contained in the current edition of the *International Telecommunication Union (ITU) Radio Regulations. Note:* In the table of allocation, the first two characters of each call sign (whether two letters or one number and one letter, in that order) identify the nationality of the station. In certain instances where the complete alphabetical block is allocated to a single nation, the first letter is sufficient for national identity. Individual assignments are made by appropriate national assignment authorities from the national allocation. [47CFR]

call spill-over: In common-channel signaling, the effect on a traffic circuit of the arrival at a switching center of an abnormally delayed call control signal relating to a previous call, while a subsequent call is being set up on the circuit. (188)

call splitting: A switching system service feature that allows a switch attendant to talk privately in either direction on an established call.

call tracing: A procedure that permits an entitled user to be informed about the routing of data for an established connection, identifying the entire route from the origin to the destination. *Note:* There are two types of call tracing. Permanent call tracing permits tracing of all calls. On-demand call tracing permits tracing, upon request, of a specific call, provided that the called party dials a designated code immediately after the call to be traced is disconnected, *i.e.,* before another call is received or placed.

call transfer: A switching system service feature that allows the calling or called user to instruct the local switching equipment or switch attendant to transfer an existing call to another terminal. *Note:* Call transfer may be available on a call-by-call basis or on a semipermanent basis.

call waiting: In telephony, a service feature that provides an indication to a terminal already engaged in an established call that one or more calls are awaiting connection.

CAMA: *Acronym for* **centralized automatic message accounting.**

camp-on: *See* **automatic callback, called-party camp-on, queue traffic.**

camp-on busy signal: 1. A signal that informs a busy telephone user that another call originator is waiting for a connection. **2.** A teleprinter exchange facility signal that automatically causes a calling station to retry the call-receiver number after a given interval when the call-receiver teleprinter is occupied or the circuits are busy. *Synonym* **speed-up tone.**

camp-on-with-recall: A camp-on with the release of the call-originator terminal until the called-receiver terminal becomes free. *Note:* The call originator can thus establish other calls until the recall signal is obtained, rather than simply wait until the call-receiver line is available.

CAN: *Abbreviation for* **cancel character.**

Canadian Standards Association (CSA): An independent, nongovernment, not-for-profit association for the development, by consensus, of Canadian standards and product certification.

cancel character (CAN): 1. A control character used by some conventions to indicate that the data with which it is associated are in error or are to be disregarded. **2.** An accuracy control character used to indicate that the data with which it is associated are in error, are to be disregarded, or cannot be represented on a particular device.

capacitive coupling: The transfer of energy from one circuit to another by means of the mutual capacitance between the circuits. (188) *Note 1:* The coupling may be deliberate or inadvertent. *Note 2:* Capacitive coupling favors transfer of the higher frequency components of a signal, whereas inductive coupling favors lower frequency components, and conductive coupling favors neither higher nor lower frequency components.

capacity: *See* **channel capacity, traffic capacity.**

capture effect: A phenomenon, associated with FM reception, in which only the stronger of two signals at or near the same frequency will be demodulated. (188) *Note 1:* The complete suppression of the weaker signal occurs at the receiver limiter, where it is treated as noise and rejected. *Note 2:* When both signals are nearly equal in strength, or are fading independently, the receiver may switch from one to the other. *Synonym* **FM capture effect.**

cardinal radial: Those eight radials at 0°, 45°, 90°, 135°, 180°, 225°, 270°, and 315° of azimuth with respect to true north. [47CFR] *Note:* The four radials at 0°, 90°, 180°, and 270° of azimuth with respect to true north are referred to as the cardinal points. The cardinal points are equivalent to true north, east, south, and west.

carrier: *Synonym* **common carrier.**

carrier (cxr): 1. A wave suitable for modulation by an information-bearing signal. (188) **2.** An unmodulated emission. (188) *Note:* The carrier is usually a sinusoidal wave or a uniform or predictable series of pulses. *Synonym* **carrier wave. 3.** Sometimes employed as a *synonym for* **carrier system.**

carrier dropout: A short-duration loss of carrier signal. (188)

carrier frequency: 1. The nominal frequency of a carrier wave. (188) **2.** In frequency modulation, *synonym* **center frequency.**

carrier leak: The carrier remaining after carrier suppression in a suppressed carrier transmission system. (188) *Note:* Sometimes the residual carrier is used to provide the reference for an automatic frequency control system.

carrier level: The level of a carrier signal at a specified point in a communications system. *Note:* The carrier level is usually expressed in dB relative to a specified reference level. (188)

carrier multiplex: *See* **frequency-division multiplexing.**

carrier noise level: The noise level resulting from undesired variations of a carrier in the absence of any intended modulation. (188) *Synonym* **residual modulation.**

carrier power (of a radio transmitter): 1. The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation. [NTIA] [RR](188) *Note:* The concept does not apply to pulse modulation or frequency-shift keying. **2.** The average unmodulated power supplied to a transmission line.

carrier sense: In a local area network, an ongoing activity of a data station to detect whether another station is transmitting.

carrier sense multiple access (CSMA): A network control scheme in which a node verifies the absence of other traffic before transmitting.

carrier sense multiple access with collision avoidance (CSMA/CA): A network control protocol in which (a) a carrier sensing scheme is used, (b) a data station that intends to transmit sends a jam signal, (c) after waiting a sufficient time for all stations to receive the jam signal, the data station transmits a frame, and (d) while transmitting, if the data station detects a jam signal from another station, it stops transmitting for a random time and then tries again.

carrier sense multiple access with collision detection (CSMA/CD): A network control protocol in which (a) a carrier sensing scheme is used and (b) a transmitting data station that detects another signal while transmitting a frame, stops transmitting that frame, transmits a jam signal, and then waits for a random time interval before trying to send that frame again.

carrier shift: **1.** In the transmission of binary or teletypewriter signals, keying in which the carrier frequency is shifted in one direction for marking signals and in the opposite direction for spacing signals. (188) **2.** In amplitude modulation, a condition that results from imperfect modulation in which the positive and negative excursions of the modulating envelope are unequal in amplitude. *Note 1:* The carrier shift results in a change in carrier power. *Note 2:* The carrier shift may be a shift to a higher or to a lower frequency. (188)

carrier suppression: *See* **suppressed carrier transmission.**

carrier synchronization: In a radio receiver, the generation of a reference carrier with a phase closely matching that of a received signal.

carrier system: A multichannel telecommunications system in which a number of individual circuits (data, voice, or combination thereof) are multiplexed for transmission between nodes of a network. (188) *Note 1:* In carrier systems, many different forms of multiplexing may be used, such as time-division multiplexing and frequency-division multiplexing. *Note 2:* Multiple layers of multiplexing may ultimately be performed upon a given input signal; *i.e.*, the output resulting from one stage of modulation may in turn be modulated. *Note 3:* At a given node, specified channels, groups, supergroups, *etc.*, may be demultiplexed without demultiplexing the others. *Synonym (loosely)* **carrier.**

carrier-to-noise ratio (CNR): In radio receivers, the ratio of the level of the carrier to that of the noise in the intermediate frequency (IF) band before any nonlinear process, such as amplitude limitation and detection, takes place. (188) *Note:* The CNR is usually expressed in dB.

carrier-to-receiver noise density (C/kT): In satellite communications, the ratio of the received carrier power to the receiver noise power density. *Note 1:* The carrier-to-receiver noise density ratio is usually expressed in dB. *Note 2:* The carrier-to-receiver noise density is given by C/kT, where C is the received carrier power in watts, k is Boltzmann's constant in joules per kelvin, and T is the receiver system noise temperature in kelvins. *Note 3:* The receiver noise power density, kT, is the receiver noise power per hertz. (188)

carrier wave: *Synonym* **carrier (cxr) (def. #2).**

CARS: *Acronym for* **cable television relay service.**

Carson bandwidth rule: A rule defining the approximate bandwidth requirements of communications system components for a carrier signal that is frequency modulated by a continuous or broad spectrum of frequencies rather than a single frequency. *Note 1:* The Carson bandwidth rule is expressed by the relation CBR = $2(\Delta f + f_m)$ where CBR is the bandwidth requirement, Δf is the carrier peak deviation frequency, and f_m is the highest modulating frequency. *Note 2:* The Carson bandwidth rule is often applied to transmitters, antennas, optical sources, receivers, photodetectors, and other communications system components.

CAS: *Abbreviation for* **centralized attendant services.**

CASE: *Acronym for* **computer-aided software engineering, computer-aided systems engineering.** Software used for the automated development of systems software, *i.e.*, computer code. *Note 1:* CASE functions include analysis, design, and programming. *Note 2:* CASE tools automate methods for designing, documenting, and producing structured computer code in the desired programming language.

case shift: **1.** In data equipment, the change from letters to other characters, or vice versa. (188) **2.** In typewriting or typesetting, the change from lower case letters to upper case letters, or vice versa.

CASE technology: Technology that makes use of computer assisted software engineering (CASE) to enhance the development of systems design and development.

Cassegrain antenna: An antenna in which the feed radiator is mounted at or near the surface of a concave main reflector and is aimed at a convex secondary reflector slightly inside the focus of the main reflector. *Note 1:* Energy from the feed unit illuminates the secondary reflector, which reflects it back to the main reflector, which then forms the desired forward beam. *Note 2:* The Cassegrain antenna design is adapted from optical telescope technology and allows the feed radiator to be more easily supported.

catastrophic degradation: The rapid reduction of the ability of a system, subsystem, component, equipment, or software to perform its intended function. *Note:* Catastrophic degradation usually results in total failure to perform any function.

Category 3: The ANSI/EIA/TIA-568 designation for 100-ohm unshielded twisted-pair cables and associated connecting hardware whose characteristics are specified for data transmission up to 16 Mb/s.

Category 4: The ANSI/EIA/TIA-568 designation for 100-ohm unshielded twisted-pair cables and associated connecting hardware whose characteristics are specified for data transmission up to 20 Mb/s.

Category 5: The ANSI/EIA/TIA-568 designation for 100-ohm unshielded twisted-pair cables and associated connecting hardware whose characteristics are specified for data transmission up to 100 Mb/s.

CATV: *Abbreviation for* **cable TV.**

cavity: A volume defined by conductor-dielectric or dielectric-dielectric reflective boundaries, or a combination of both, and having dimensions designed to produce specific interference effects (constructive or destructive) when excited by an electromagnetic wave.

C-band: *Colloquially,* a frequency band between 4 GHz and 6 GHz used in satellite communications. *Note 1:* For procurement purposes, the radio frequency band(s) must be specified using the upper and lower limits of the band, per 47 CFR 300. *Note 2:* Letter designators of radio frequency bands are imprecise, deprecated, and legally obsolete.

CCH: *Abbreviation for* **connections per circuit hour.**

CCIR: *Abbreviation for* International Radio Consultative Committee; a predecessor organization of the ITU-T.

CCIS: *Abbreviation for* **common-channel interoffice signaling.**

CCITT: *Abbreviation for* International Telegraph and Telephone Consultative Committee; a predecessor organization of the ITU-T.

CCS: *Abbreviation for* **hundred call-seconds.** *See* **call-second.**

CCSA: *Abbreviation for* **common control switching arrangement.**

CDF: *Abbreviation for* **combined distribution frame.**

CDMA: *Abbreviation for* **code-division multiple access.**

CDPSK: *Abbreviation for* **coherent differential phase-shift keying.**

CDR: *Abbreviation for* **call detail recording.**

CD ROM: *Abbreviation for* **compact disk read-only memory.** An optical digital storage device, of high capacity, capable of being read from but not written to.

C-E: *Abbreviation for* **communications-electronics.**

CEI: *Abbreviation for* **comparably efficient interconnection.**

cell: **1.** In cellular mobile, the geographical area covered by the smaller of: a base station, or a subsystem (sector antenna) of that base station corresponding to a specific logical identification on the radio path. *Note:* Mobile stations in a cell may be reached by the corresponding radio equipment of the base station. **2.** In communications, a string that contains a header and user information. *Note 1:* A cell is dedicated to one user for one session. Cells for a given system are usually of fixed length and smaller than a frame, such as 424 bits for a cell, compared to 1024 for a frame. *Note 2:* In asynchronous transfer

mode (ATM) systems, a cell consists of 53 bytes, *i.e.*, a 5-byte header field and a 48-byte information field. *Note 3:* A cell does not have error-correction capability and is therefore suited for low-BER communications systems, such as digital fiber optic systems. **3.** In OSI, a fixed-length block labeled at the Physical Layer of the Open Systems Interconnection—Reference Model (OSI—RM). **4.** In computer systems, an addressable, internal hardware location. **5.** In computer applications, a single location on a spreadsheet.

cell relay: A statistically multiplexed interface protocol for packet switched data communications that uses fixed-length packets, *i.e.*, cells, to transport data. *Note 1:* Cell relay transmission rates usually are between 56 kb/s and 1.544 Mb/s, *i.e.*, the data rate of a DS1 signal. *Note 2:* Cell relay protocols (a) have neither flow control nor error correction capability, (b) are information-content independent, and (c) correspond only to layers one and two of the ISO Open Systems Interconnection—Reference Model. *Note 3:* Cell relay systems enclose variable-length user packets in fixed-length packets, *i.e.*, cells, that add addressing and verification information. Frame length is fixed in hardware, based on time delay and user packet-length considerations. One user data message may be segmented over many cells. *Note 4:* Cell relay is an implementation of fast packet technology that is used in (a) connection-oriented broadband integrated services digital networks (B-ISDN) and (b) connectionless IEEE 802.6, switched multi-megabit data service (SMDS). *Note 5:* Cell relay is used for time-sensitive traffic such as voice and video.

cellular mobile: A mobile communications system that uses a combination of radio transmission and conventional telephone switching to permit telephone communication to and from mobile users within a specified area. *Note:* In cellular mobile systems, large geographical areas are segmented into many smaller areas, *i.e.*, cells, each of which has its own radio transmitters and receivers and a single controller interconnected with the public switched telephone network. *Synonym*s **cellular phone, cellular radio, cellular telephone**.

cellular phone: *Synonym* **cellular mobile.**

cellular radio: *Synonym* **cellular mobile.**

cellular telephone: *Synonym* **cellular mobile**.

CELP: *Acronym for* **code-excited linear prediction.**

center frequency: 1. In frequency modulation, the rest frequency, *i.e.*, the frequency of the unmodulated carrier. (188) *Synonym* **carrier frequency. 2.** In facsimile systems, the frequency midway between the picture-black and picture-white frequencies. (188)

centralized attendant services (CAS): A function of a usually centrally located attendant console that permits the control of multiple switches, some of which may be geographically remote.

centralized automatic message accounting (CAMA): An automatic message accounting system that serves more than one switch from a central location. *Note:* When using CAMA, human intervention may be required.

centralized operation: Operation of a communication network in which transmission may occur between the control station and any tributary station, but not between tributary stations.

centralized ordering group (COG): An organization provided by some communications service providers to coordinate services between the companies and vendors.

central office (C.O.): A common carrier switching center in which trunks and loops are terminated and switched. *Note:* In the DOD, "common carrier" is called *"commercial carrier." Synonyms* **exchange, local central office, local exchange, local office, switching center** (except in DOD DSN [formerly AUTOVON] usage), **switching exchange, telephone exchange.** *Deprecated synonym* **switch.**

central office connecting facility: *Loosely*, in the sense of a trunk between public and private switches, *a synonym for* **central office trunk.** *See* **trunk.**

central office trunk: *Loosely*, in the sense of a trunk between public and private switches, *a synonym for* **central office connecting facility.** *See* **trunk.**

central processing unit: *See* **CPU.**

central processor: *Synonym* **CPU.**

Centrex® (CTX) service: A service offered by Bell Operating Companies that provides functions and features comparable to those provided by a PBX or a PABX. *Note: "Centrex® C.O."*indicates that all equipment except the attendant's position and station equipment is located in the central office. *"Centrex® C.U."*indicates that all equipment, including the dial switching equipment, is located on the customer's premises.

certification: [The] comprehensive evaluation of the technical and nontechnical security features of an AIS [automated information system] and other safeguards, made in support of the accreditation process, to establish the extent to which a particular design and implementation meets a set of specified security requirements. [NIS]

certified network engineer: In computer networking, one who has met proprietary training and certification requirements pertinent to network design or maintenance. *Note:* The training requirements embrace both software and hardware configuration.

cesium clock: A clock containing a cesium standard as a frequency-determining element. (188)

cesium standard: A primary frequency standard in which electronic transitions between the two hyperfine ground states of cesium-133 atoms is used to control the output frequency. (188) *Note*: The energy level between the two hyperfine ground states corresponds, in the absence of external influences (*e.g.*, the magnetic field of the Earth), to a frequency of 9,192,631,770 Hz.

chad: The material separated from a punched tape or a punched card when forming a hole. (188)

chadless tape: 1. Punched tape that has been punched in such a way that chad is not formed. **2.** A punched tape in which only partial perforation is performed so that the chad remains attached to the tape. (188) *Note:* The partial perforation is deliberate, and should not be confused with imperfect chadding.

chad tape: Punched tape used in telegraphy/teletypewriter operation. (188)

channel: 1. A connection between initiating and terminating nodes of a circuit. (188) **2.** A single path provided by a transmission medium via either (a) physical separation, such as by multipair cable or (b) electrical separation, such as by frequency- or time-division multiplexing. (188) **3.** A path for conveying electrical or electromagnetic signals, usually distinguished from other parallel paths. (188) **4.** Used in conjunction with a predetermined letter, number, or codeword to reference a specific radio frequency. (188) **5.** The portion of a storage medium, such as a track or a band, that is accessible to a given reading or writing station or head. **6.** In a communications system, the part that connects a data source to a data sink.

channel-associated signaling: Signaling in which the signals necessary to switch a given circuit are transmitted via the circuit itself or via a signaling channel permanently associated with it. (188)

channel bank: The part of a carrier-multiplex terminal that performs the first step of modulation by multiplexing a group of channels into a higher bandwidth analog channel or higher bit-rate digital channel and, conversely, demultiplexes these aggregates back into individual channels. (188)

channel bits: Binary data transmitted over a communications link. *Note:* Channel bits are derived from user information by FEC (forward error correction) coding and interleaving.

channel capacity: The maximum possible information transfer rate through a channel, subject to specified constraints. (188)

channel gate: A device for connecting a channel to a highway, or a highway to a channel, at specified times.

channelization: The use of a single wideband, *i.e.*, high-capacity, facility to create many relatively narrowband, *i.e.*, lower capacity, channels by subdividing the wideband facility. (188)

channel noise level: **1.** The ratio of the channel noise at any point in a transmission system to an arbitrary level chosen as a reference. (188) *Note 1:* The channel noise level may be expressed in (a) dB above reference noise (dBrn), (b) dB above reference noise with C-message weighting (dBrnC), or (c) adjusted dB (dBa). *Note 2:* Each unit used to measure channel noise level reflects a circuit noise reading of a specialized instrument designed to account for different interference effects that occur under specified conditions. **2.** The noise power density spectrum in the frequency range of interest. (188) **3.** The average noise power in the frequency range of interest. (188)

channel offset: The constant frequency difference between a channel frequency and a reference frequency which may frequency hop. (188)

channel packing: Maximizing the use of voice frequency channels for data transmission by multiplexing a number of channels of lower data rate into a single voice frequency channel of higher data rate. (188)

channel reliability (ChR): The percentage of time a channel was available for use in a specified period of scheduled availability. *Note 1:* Channel reliability is given by

$$ChR = 100\left(1 - \frac{T_o}{T_s}\right) = 100\frac{T_a}{T_s},$$

where T_o is the channel total outage time, T is the channel total scheduled time, and T_a is the channel total available time. *Note 2:* $T_s = T_a + T_o$. (188)

channel service unit (CSU): A line bridging device that (a) is used to perform loop-back testing, (b) may perform bit stuffing, (c) may also provide a framing and formatting pattern compatible with the network, and (d) is the last signal regeneration point, on the loop side, coming from the central office, before the regenerated signal reaches a multiplexer or data terminal equipment (DTE).

channel supergroup: *See* **group.**

channel time slot: A time slot that starts at a particular instant in a frame and is allocated to a channel for transmitting data, such as a character or an in-slot signal. (188)

character: **1.** A letter, digit, or other symbol that is used as part of the organization, control, or representation of data. (188) **2.** One of the units of an alphabet. (188)

character check: A method of error detection using the preset rules for the formulation of characters. (188)

character-count integrity: The preservation of the exact number of characters that are originated in a message in the case of message communications, or per unit time, in the case of a user-to-user connection. (188) *Note:* Character-count integrity is not the same as character integrity, which requires that the characters delivered are, in fact, exactly the same as they were originated.

character filter: Software that is capable of selectively removing characters from a data stream, *e.g.*, software that removes communications-control characters so that they are not printed.

character generator: A functional unit that converts the coded representation of a character into the graphic representation of the character for display.

character integrity: Preservation of a character during processing, storage, and transmission.

character interval: In a communications system, the total number of unit intervals required to transmit any given character, including synchronizing, information, error checking, or control characters, but not including signals that are not associated with individual characters. *Note:* An example of a time interval that is excluded when determining character interval is any time added between the end of a stop signal and the beginning of the next start signal to accommodate changing transmission conditions, such as a change in data signaling rate or buffering requirements. This added time is defined as a part of the intercharacter interval.

characteristic distortion: In telegraphy, the distortion caused by transients that, as a result of previous

modulation, are present in the transmission channel. (188) *Note:* Characteristic distortion effects are not consistent. Their effects on a given signal transition are dependent upon transients remaining from previous signal transitions.

characteristic frequency: A frequency which can be easily identified and measured in a given emission. A carrier frequency may, for example, be designated as the characteristic frequency. [NTIA] [RR] (188)

characteristic impedance (Z_o): 1. The impedance of a circuit that, when connected to the output terminals of a uniform transmission line of arbitrary length, causes the line to appear infinitely long. *Note 1:* A uniform line terminated in its characteristic impedance will have no standing waves, no reflections from the end, and a constant ratio of voltage to current at a given frequency at every point on the line. *Note 2:* If the line is not uniform, the iterative impedance must be used. **2.** For Maxwell's equations, the impedance of a linear, homogeneous, isotropic, dielectric propagation medium free of electric charge, given by the relation $Z=(\mu/\epsilon)^{1/2}$ where μ is the magnetic permeability and ϵ is the electric permittivity of the medium.

character recognition: The identification of characters by automatic means.

character set: 1. A finite set of different characters that is complete for a given purpose. (188) *Note:* A character set may or may not include punctuation marks or other symbols. **2.** An ordered set of unique representations. (188) *Note:* Examples of character sets include the 26 letters of the English alphabet, Boolean characters 0 and 1, the 128 ASCII characters, and International Telegraph Alphabet 5 (ITA-5), published as CCITT Recommendation V.3 and ISO 646.

characters per inch (cpi): In a recording medium, a unit of linear packing density of characters. (188)

characters per second (cps): A unit of signaling speed used to express the number of characters passing a designated point per second.

character-stepped: Pertaining to control of start-stop teletypewriter equipment in which a device is stepped one character at a time. *Note:* The step interval is equal to or greater than the character interval at the applicable signaling rate. (188)

charging reference location: In Universal Personal Telecommunications Service, the geographical location that may be used by the UPT service providers to determine the distance-related charges applying to the call originator and/or to the destination UPT user.

check: A process for determining accuracy.

check bit: A bit, such as a parity bit, derived from and appended to a bit string for later use in error detection and possibly error correction. (188)

check character: A character, derived from and appended to a data item, for later use in error detection and possibly error correction. (188)

check digit: A digit, derived from and appended to a data item, for later use in error detection and possibly error correction. (188)

checksum: 1. The sum of a group of data items, which sum is used for checking purposes. *Note 1:* A checksum is stored or transmitted with the group of data items. *Note 2:* The checksum is calculated by treating the data items as numeric values. *Note 3:* Checksums are used in error detecting and correcting. **2.** [The] value computed, via some parity or hashing algorithm, on information requiring protection against error or manipulation. *Note:* Checksums are stored or transmitted with data and are intended to detect data integrity problems. [NIS]

chip: 1. *Synonym* **integrated circuit. 2.** In satellite communications systems, the smallest element of data in an encoded signal. **3.** The most elemental component of a spread spectrum signal when it is decompressed in time; that is, the longest duration signal in which signal parameters are approximately constant.. **4.** In micrographic and display systems, a relatively small and separate piece of microform that contains microimages and coded information for search, identification, and retrieval purposes.

chip rate: 1. The rate of encoding. [NTIA] **2.** In direct-sequence-modulation spread-spectrum systems,

the rate at which the information signal bits are transmitted as a pseudorandom sequence of chips. *Note:* The chip rate is usually several times the information bit rate.

chip time: In spread-spectrum systems, the duration of a chip produced by a frequency-hopping signal generator.

chirping: 1. The rapid changing, as opposed to long-term drifting, of the frequency of an electromagnetic wave. *Note:* Chirping is most often observed in pulsed operation of a source. **2.** A pulse compression technique that uses (usually linear) frequency modulation during the pulse.

chroma keying: In television, nearly instantaneous switching between multiple video signals, based on the state, *i.e.*, phase, of the color (chroma) signal of one, to form a single composite video signal. *Note 1:* Chroma keying is used to create an overlay effect in the final picture, *e.g.*, to insert a false background, such as a weather map or scenic view, behind the principal subject being photographed. *Note 2:* The principal subject is photographed against a background having a single color or a relatively narrow range of colors, usually in the blue. When the phase of the chroma signal corresponds to the preprogrammed state or states associated with the background color, or range of colors, behind the principal subject, the signal from the alternate, *i.e.*, false, background is inserted in the composite signal and presented at the output. When the phase of the chroma signal deviates from that associated with the background color(s) behind the principal subject, video associated with the principal subject is presented at the output. *Synonym* **color keying.** *Colloquial synonym* **blue-screening.** *Contrast with* **chrominance signal, composite video.**

chromatic dispersion: *A commonly used (but redundant) synonym for* **material dispersion.** *See* **dispersion.**

chrominance signal: In color television, that signal or portion of the composite signal that bears the color information.

cipher: 1. [A] cryptographic system in which units of plain text are substituted according to a predetermined key. [NIS] *Note:* A cipher is any cryptographic system in which arbitrary symbols, or groups of symbols, represent units of plain text of regular length, usually single letters, or in which units of plain text are rearranged, or both, in accordance with certain predetermined rules. **2.** The result of using a cipher. *Note:* An example of a cipher is an enciphered message or text.

cipher system: Any cryptosystem that requires the use of a key to convert, unit by unit, plain text, encoded text, or signals into an unintelligible form for secure transmission. *Note:* The capability to decipher must be available at the receiving site.

cipher text: Enciphered information. [NIS] *Note:* Cipher text is the result obtained from enciphering plain or encoded text.

ciphony: The process of enciphering audio information. *Note: "Ciphony"* is a contraction of *"ciphered telephony."*

circuit: 1. The complete path between two terminals over which one-way or two-way communications may be provided. (188) **2.** An electronic path between two or more points, capable of providing a number of channels. **3.** A number of conductors connected together for the purpose of carrying an electrical current. **4.** An electronic closed-loop path among two or more points used for signal transfer. (188) **5.** A number of electrical components, such as resistors, inductances, capacitors, transistors, and power sources connected together in one or more closed loops.

circuit noise level: At any point in a transmission system, the ratio of the circuit noise at that point to an arbitrary level chosen as a reference. (188) *Note:* The circuit noise level is usually expressed in dBrn0, signifying the reading of a circuit noise meter, or in dBa0, signifying circuit noise meter reading adjusted to represent an interfering effect under specified conditions.

circuit reliability (*CiR*): The percentage of time a circuit was available for use in a specified period of scheduled availability. *Note 1:* Circuit reliability is given by

$$CiR = 100\left(1 - \frac{T_o}{T_s}\right) = 100\frac{T_a}{T_s} \quad ,$$

where T_o is the circuit total outage time, T_s is the circuit total scheduled time, and T_a is the circuit total available time. *Note 2:* $T_s = T_a + T_o$. (188) *Synonym* **time availability.**

circuit restoration: The process by which a communications circuit is established between two users after disruption or loss of the original circuit. *Note:* Circuit restoration is usually performed in accordance with planned procedures and priorities. Restoration may be effected automatically, *e.g.*, by switching to a hot standby, or manually, *e.g.*, by manual patching.

circuit routing: In open systems architecture, the logical path of a message in a communications network based on a series of gates at the physical network layer in the Open Systems Interconnection—Reference Model and the GOSIP FIPS PUB 146-1.

circuit-switched data transmission service: A data transmission service requiring the establishment of a circuit-switched connection before data can be transferred from source data terminal equipment (DTE) to a sink DTE. *Note:* A circuit-switched data transmission service uses a connection-oriented network.

circuit switching: 1. A method of routing traffic through a switching center, from local users or from other switching centers, whereby a connection is established between the calling and called stations until the connection is released by the called or calling station. (188) **2.** A process that, on demand, connects two or more data terminal equipments (DTEs) and permits the exclusive use of a data circuit between them until the connection is released.

circuit switching center: *See* **circuit switching, switching center.**

circuit switching unit (CSU): Equipment used for routing messages over common-user circuits that interconnect a source data terminal equipment (DTE) to a sink DTE for information interchange.

circuit transfer mode: In ISDN applications, a transfer mode by means of permanent allocation of channels or bandwidth between connections.

circular polarization: In electromagnetic wave propagation, polarization such that the tip of the electric field vector describes a helix. *Note 1:* The magnitude of the electric field vector is constant. (188) *Note 2:* The projection of the tip of the electric field vector upon any fixed plane intersecting, and normal to, the direction of propagation, describes a circle. *Note 3:* A circularly polarized wave may be resolved into two linearly polarized waves in phase quadrature with their planes of polarization at right angles to each other. *Note 4:* Circular polarization may be referred to as *"right-hand"* or *"left-hand,"*depending on whether the helix describes the thread of a right-hand or left-hand screw, respectively.

circulator: 1. A passive junction of three or more ports in which the ports can be accessed in such an order that when power is fed into any port it is transferred to the next port, the first port being counted as following the last in order. (188) **2.** In radar, a device that switches the antenna alternately between the transmitter and receiver.

civision: 1. The application of cryptography to television signals. **2.** Television signals that have been enciphered to preserve the confidentiality of the transmitted information.

***C*/k*T*:** *Abbreviation for* **carrier-to-receiver noise density.**

cladding: 1. Of an optical fiber, one or more layers of material of lower refractive index, in intimate contact with a core material of higher refractive index. (188) **2.** A process of covering one metal with another (usually achieved by pressure rolling, extruding, drawing, or swaging) until a bond is achieved. (188)

cladding diameter: In the cross section of a realizable optical fiber, ideally circular, but in practice assumed to a first approximation to be elliptical, the average of the diameters of the smallest circle that can be

circumscribed about the cladding, and the largest circle that can be inscribed within the cladding.

cladding eccentricity: *See* **ovality.**

cladding mode: An undesired mode that is confined to the cladding of an optical fiber by virtue of the fact that the cladding has a higher refractive index than the surrounding medium, *i.e.*, air or primary polymer overcoat. *Note:* Modern fibers have a primary polymer overcoat with a refractive index that is slightly higher, rather than lower, than that of the cladding, in order to strip off cladding modes after only a few centimeters of propagation.

cladding mode stripper: A device for converting optical fiber cladding modes to radiation modes; as a result, the cladding modes are removed from the fiber. *Note:* Often a material such as the fiber coating or jacket having a refractive index equal to or greater than that of the fiber cladding will perform this function.

cladding noncircularity: *See* **ovality.**

cladding ovality: *Synonym* **cladding noncircularity**. *See* **ovality.**

cladding ray: *See* **cladding mode**.

C-language: A general-purpose, high-level, structured computer programming language. *Note:* C-language was originally designed for and implemented on the UNIX™ operating system.

CLASS: *Acronym for* **custom local area signaling services.**

class d address: *Synonym (in Internet protocol)* **multicast address.**

classmark: A designator used to describe the service feature privileges, restrictions, and circuit characteristics for lines or trunks that access a switch. *Note:* Examples of classmarks include precedence level, conference privilege, security level, and zone restriction. (188) *Synonym* **class-of-service mark.**

class of emission: The set of characteristics of an emission, designated by standard symbols, *e.g.*, type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics. [NTIA] [RR]

class of office: A ranking, assigned to each switching center in a communications network, determined by the center switching functions, interrelationships with other offices, and transmission requirements.

class of service: 1. A designation assigned to describe the service treatment and privileges given to a particular terminal. (188) **2.** A subgrouping of telephone users for the purpose of rate distinction. *Note:* Examples of class of service subgrouping include distinguishing between (a) individual and party lines, (b) Government and non-Government lines, (c) those permitted to make unrestricted international dialed calls and those not so permitted, (d) business, residence, and coin-operated, (e) flat rate and message rate, and (f) restricted and extended area service. **3.** A category of data transmission provided by a public data network in which the data signaling rate, the terminal operating mode, and the code structure, are standardized. *Note:* Class of service is defined in CCITT Recommendation X.1. *Synonym* **user service class.**

class-of-service mark: *Synonym* **classmark.**

clear: To cause one or more storage locations to be in a prescribed state, usually that corresponding to a zero or that corresponding to the space character.

clear channel: 1. In radio broadcasting, a frequency assigned for the exclusive use of one entity. **2.** In networking, a signal path that provides its full bandwidth for a user's service. *Note:* No control or signaling is performed on this path.

clear collision: Contention that occurs when a DTE and a DCE simultaneously transfer a clear request packet and a clear indication packet specifying the same logical channel. *Note:* The DCE will consider that the clearing is completed and will not transfer a DCE clear confirmation packet.

clear confirmation signal: A call control signal used to acknowledge reception of the data-terminal-equipment (DTE) clear request by the data circuit-

terminating equipment (DCE) or to acknowledge the reception of the DCE clear indication by the DTE.

clearing: 1. A sequence of events used to disconnect a call and return to the ready state. (188) **2.** Removal of data from an AIS, its storage devices, and other peripheral devices with storage capacity, in such a way that the data may not be reconstructed using normal system capabilities (*i.e.*, through the keyboard). *Note:* An AIS need not be disconnected from any external network before clearing takes place. Clearing enables a product to be reused within, but not outside of, a secure facility. It does not produce a declassified product by itself, but may be the first step in the declassification process. [NIS]

clear message: 1. A message that (a) is sent in the forward direction and the backward direction, (b) contains a circuit-released signal or circuit-released acknowledgment signal, and (c) usually contains an indication of whether the message is in the forward or the backward direction. **2.** A message in plain language, *i.e.*, not enciphered.

clear text: *Synonym* **plain text.**

cleave: 1. In an optical fiber, a deliberate, controlled break, intended to create a perfectly flat endface, perpendicular to the longitudinal axis of the fiber. *Note:* A cleave is made by first introducing a microscopic fracture ("nick") into the fiber with a special tool, called a "*cleaving tool,*"which has a sharp blade of hard material, such as diamond, sapphire, or tungsten carbide. If proper tension is applied to the fiber as the nick is made, or immediately afterward (this may be done by the cleaving tool in some designs, or manually in other designs), the fracture will propagate in a controlled fashion, creating the desired endface. **2**. To break a fiber in such a controlled fashion. *Note:* A good cleave is required for a successful splice of an optical fiber, whether by fusion or mechanical means. Also, some types of fiber-optic connectors do not employ abrasives and polishers. Instead, they use some type of cleaving technique to trim the fiber to its proper length, and produce a smooth, flat perpendicular endface.

client: In networking, a software application that allows the user to access a service from a server computer, *e.g.*, a server computer on the Internet.

client-server: Any hardware/software combination that generally adheres to a client-server architecture, regardless of the type of application.

client-server architecture: Any network-based software system that uses client software to request a specific service, and corresponding server software to provide the service from another computer on the network.

clipper: A circuit or device that limits the instantaneous output signal amplitude to a predetermined maximum value, regardless of the amplitude of the input signal. (188)

clipper chip: An IC designed for secure communications.

clipping: 1. In telephony, the loss of the initial or final parts of a word, words, or syllable, usually caused by the nonideal operation of voice-actuated devices. **2.** The limiting of instantaneous signal amplitudes to a predetermined maximum value. (188) **3.** In a display device, the removal of those parts of display elements that lie outside of a given boundary.

clock: 1. A reference source of timing information. (188) **2.** A device providing signals used in a transmission system to control the timing of certain functions such as the duration of signal elements or the sampling rate. (188) **3.** A device that generates periodic, accurately spaced signals used for such purposes as timing, regulation of the operations of a processor, or generation of interrupts.

clock error: The difference between local clock time or value and a designated reference clock time or value. *Note:* Subtracting the clock difference from the local clock brings the local clock into agreement with the reference clock.

clock phase slew: The rate of relative phase change between a given clock signal and a stable reference signal. (188) *Note:* The two signals are generally at or near the same frequency or have an integral multiple frequency relationship.

clock rate: The rate at which a clock issues timing pulses. *Note:* Clock rates are usually expressed in pulses per second, such as 4.96 Mpps (megapulses per second).

clock tolerance: The maximum permissible departure of a clock indication from a designated time reference such as Coordinated Universal Time (UTC).

clock track: A track on which a pattern of signals is recorded to provide a timing reference.

clockwise polarized wave: *Synonym* **right-hand (or clockwise) polarized wave.**

closed captioning: In broadcast and cable television, the insertion, into the blank lines between frames, of information that may be decoded and displayed on the screen as written words corresponding to those being spoken and transmitted via the conventional audio subcarrier. *Note:* Closed captioning, developed for the hearing-impaired, requires a special decoder, which may be external to, or built into, the television receiver. Closed captioning is mandated by the Americans with Disabilities Act of 1990.

closed circuit: 1. In radio and television transmission, pertaining to an arrangement in which programs are directly transmitted to specific users and not broadcast to the general public. (188) **2.** In telecommunications, a circuit dedicated to specific users. (188) **3.** A completed electrical circuit.

closed-loop noise bandwidth: The integral, over all frequencies, of the absolute value of the closed-loop transfer function of a phase-locked loop. *Note:* The closed-loop noise bandwidth, when multiplied by the noise spectral density, gives the output noise power in a phase-locked loop.

closed-loop transfer function: A mathematical expression (algorithm) describing the net result of the effects of a closed (feedback) loop on the input signal to the circuits enclosed by the loop. *Note 1:* The closed-loop transfer function is measured at the output. *Note 2:* The output signal waveform can be calculated from the closed-loop transfer function and the input signal waveform.

closed user group: In a network, a group of users permitted to communicate with each other but not with users outside the group. *Note:* A user data terminal equipment (DTE) may belong to more than one closed user group.

closed user group with outgoing access: A closed user group in which at least one member of the group has a facility that permits communication with one or more users external to the closed user group.

closed waveguide: An electromagnetic waveguide (a) that is tubular, usually with a circular or rectangular cross section, (b) that has electrically conducting walls, (c) that may be hollow or filled with a dielectric material, (d) that can support a large number of discrete propagating modes, though only a few may be practical, (e) in which each discrete mode defines the propagation constant for that mode, (f) in which the field at any point is describable in terms of the supported modes, (g) in which there is no radiation field, and (h) in which discontinuities and bends cause mode conversion but not radiation.

closure: *Synonym* **splice closure.**

cloud attenuation: In the transmission of electromagnetic signals, attenuation caused by absorption and scattering by water or ice particles in clouds. *Note:* The amount of cloud attenuation depends on many factors, including (a) the density, particle size, and turbulence of the clouds and (b) the transmission path length in the clouds.

C-message weighting: A noise spectral weighting used in a noise power measuring set to measure noise power on a line that is terminated by a 500-type set or similar instrument. (188) *Note:* The instrument is calibrated in dBrnC.

CMRR: *Abbreviation for* **common-mode rejection ratio.**

CNR: *Abbreviation for* **carrier-to-noise ratio, combat net radio.**

CNS: *Abbreviation for* **complementary network services.**

C.O.: *Abbreviation for* **central office.**

COAM: *Acronym for* **customer owned and maintained equipment.** *Deprecated term. See* **customer premises equipment.**

coast Earth station: An Earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service. [NTIA] [RR]

coasting mode: In timing-dependent systems, a free-running operational timing mode in which continuous or periodic measurement of clock error, *i.e.,* of timing error, is not made. *Note:* Operation in the coasting mode may be enhanced for a period of time by using clock-error data or clock-correction data (obtained during a prior period of operation in the tracking mode) to estimate clock corrections.

coast station: A land station in the maritime mobile service. [RR]

coating: *See* **primary coating.**

coax: *See* **coaxial cable.**

coaxial cable (coax): A cable consisting of a center conductor surrounded by an insulating material and a concentric outer conductor. (188) *Note:* Coaxial cable is used primarily for wideband, video, or rf applications.

coaxial patch bay: *See* **patch bay.**

COBOL: *Acronym for* **common business oriented language**. A programming language designed for business data processing.

co-channel interference: Interference resulting from two or more simultaneous transmissions on the same channel.

code: 1. A set of unambiguous rules specifying the manner in which data may be represented in a discrete form. *Note 1:* Codes may be used for brevity or security. *Note 2:* Use of a code provides a means of converting information into a form suitable for communications, processing, or encryption. (188) **2.** [Any] system of communication in which arbitrary groups of letters, numbers, or symbols represent units of plain text of varying length. *Note:* Codes may or may not provide security. Common uses include: (a) converting information into a form suitable for communications or encryption, (b) reducing the length of time required to transmit information, (c) describing the instructions which control the operation of a computer, and (d) converting plain text to meaningless combinations of letters or numbers and vice versa. [NIS] **3.** A cryptosystem in which the cryptographic equivalents, (usually called "code groups") typically consisting of letters or digits (or both) in otherwise meaningless combinations, are substituted for plain text elements which are primarily words, phrases, or sentences. **4.** A set of rules that maps the elements of one set, the coded set, onto the elements of another set, the code element set. *Synonym* **coding scheme. 5.** A set of items, such as abbreviations, that represents corresponding members of another set. **6.** To represent data or a computer program in a symbolic form that can be accepted by a processor. **7.** To write a routine.

codec: *Acronym for* **coder-decoder**. **1.** An assembly consisting of an encoder and a decoder in one piece of equipment. (188) **2.** A circuit that converts analog signals to digital code and vice versa. **3.** An electronic device that converts analog signals, such as video and voice signals, into digital form and compresses them to conserve bandwidth on a transmission path. (188) *Note:* Codecs in this sense are used in this sense for video conferencing systems.

code character: A character that (a) is used to represent a discrete value or symbol and (b) is derived in accordance with a code. (188)

code conversion: 1. Conversion of signals, or groups of signals, in one code into corresponding signals, or groups of signals, in another code. (188) **2.** A process for converting a code of some predetermined bit structure, such as 5, 7, or 14 bits per character interval, to another code with the same or a different number of bits per character interval. *Note:* In code conversion, alphabetical order is not significant.

coded character set: A character set established in accordance with unambiguous rules that define the character set and the one-to-one relationships between the characters of the set and their coded representations. (188)

coded image: A representation of a display image in a form suitable for storage and processing.

code-division multiple access (CDMA): A coding scheme, used as a modulation technique, in which multiple channels are independently coded for transmission over a single wideband channel. (188) *Note 1:* In some communication systems, CDMA is used as an access method that permits carriers from different stations to use the same transmission equipment by using a wider bandwidth than the individual carriers. On reception, each carrier can be distinguished from the others by means of a specific modulation code, thereby allowing for the reception of signals that were originally overlapping in frequency and time. Thus, several transmissions can occur simultaneously within the same bandwidth, with the mutual interference reduced by the degree of orthogonality of the unique codes used in each transmission. *Note 2:* CDMA permits a more uniform distribution of energy in the emitted bandwidth.

coded set: A set of elements onto which another set of elements has been mapped according to a code. *Note:* Examples of coded sets include the list of names of airports that is mapped onto a set of corresponding three-letter representations of airport names, the list of classes of emission that is mapped onto a set of corresponding standard symbols, and the names of the months of the year mapped onto a set of two-digit decimal numbers.

code element: One of a set of parts of which the characters in a given code may be composed. (188)

code-excited linear prediction (CELP): An analog-to-digital voice coding scheme.

code group: [A] group of letters, numbers, or both in a code system used to represent a plain text word, phrase, or sentence. [NIS] (188) *Note:* Code groups may include symbols and other elements.

code-independent data communication: *Synonym* **code-transparent data communication.**

code restriction: A service feature by which certain terminals are prevented from accessing certain features of the network.

code set: The complete set of representations defined by a particular code and language. (188)

code-transparent data communication: A mode of data communication that uses protocols that do not depend for their correct functioning on the data character set or data code used. *Synonym* **code-independent data communication.**

code word: 1. In a code, a word that consists of a sequence of symbols assembled in accordance with the specific rules of the code and assigned a unique meaning. *Note:* Examples of code words are error-detecting-or-correcting code words and communication code words, such as SOS, MAYDAY, ROGER, TEN-FOUR, and OUT. (188) **2.** A cryptonym used to identify sensitive intelligence data. [JP1] (188) **3.** A word that has been assigned a classification and a classified meaning to safeguard intentions and information regarding a classified plan or operation. [JP1]

coding: 1. In communications systems, the altering of the characteristics of a signal to make the signal more suitable for an intended application, such as optimizing the signal for transmission, improving transmission quality and fidelity, modifying the signal spectrum, increasing the information content, providing error detection and/or correction, and providing data security. *Note:* A single coding scheme usually does not provide more than one or two specific capabilities. Different codes have different advantages and disadvantages. **2.** In communications and computer systems, implementing rules that are used to map the elements of one set onto the elements of another set, usually on a one-to-one basis. **3.** The digital encoding of an analog signal and, conversely, decoding to an analog signal.

coding scheme: *Synonym* **code (def. #4).**

codress message: In military communications systems, a message in which the entire address is encrypted with the message text.

COG: *Abbreviation for* **centralized ordering group.**

coherence area: Pertaining to an electromagnetic wave, the area of a surface perpendicular to the direction of propagation, over which the

electromagnetic wave maintains a specified degree of coherence. *Note:* The specified degree of coherence is usually taken to be 0.88 or greater. (188)

coherence degree: *See* **degree of coherence.**

coherence length: The propagation distance from a coherent source to a point where an electromagnetic wave maintains a specified degree of coherence. (188) *Note 1:* In long-distance transmission systems, the coherence length may be reduced by propagation factors such as dispersion, scattering, and diffraction. *Note 2:* In optical communications, the coherence length, L, is given approximately by $L = \lambda^2/(n\Delta\lambda)$, where λ is the central wavelength of the source, n is the refractive index of the medium, and $\Delta\lambda$ is the spectral width of the source. *Note 3: Coherence length* is usually applied to the optical regime.

coherence time: For an electromagnetic wave, the time over which a propagating wave may be considered coherent. (188) *Note 1:* In long-distance transmission systems, the coherence time may be reduced by propagation factors such as dispersion, scattering, and diffraction. *Note 2:* In optical communications, coherence time, τ, is calculated by dividing the coherence length by the phase velocity of light in a medium; approximately given by $\tau = \lambda^2/(c\Delta\lambda)$ where λ is the central wavelength of the source, $\Delta\lambda$ is the spectral width of the source, and c is the velocity of light in vacuum. *Note 3: "Coherence time"* is usually applied to the optical regime.

coherent: Pertaining to a fixed phase relationship between corresponding points on an electromagnetic wave. (188) *Note:* A truly coherent wave would be perfectly coherent at all points in space. In practice, however, the region of high coherence may extend over only a finite distance.

coherent bundle: *Synonym* **aligned bundle.**

coherent differential phase-shift keying (CDPSK): Phase-shift keying (a) that is used for digital transmission, (b) in which the phase of the carrier is discretely modulated in relation to the phase of a reference signal and in accordance with data to be transmitted, and (c) in which the modulated carrier is of constant amplitude and frequency. (188) *Note:* A phase comparison is made of successive pulses, and information is recovered by examining the phase transitions between the carrier and successive pulses rather than by the absolute phases of the pulses.

coherent pulse operation: In pulsed carrier transmission, a method of operation in which a fixed phase relationship of the carrier wave is maintained from one pulse to the next. (188)

coherent radiation: *See* **coherent.**

cold standby: Pertaining to spare electronic equipment that is available for substitute use, but is not powered or warmed up and ready for use.

collective address: *Synonym* **group address.**

collective routing: Routing in which a switching center automatically delivers messages to a specified list of destinations. *Note 1:* Collective routing avoids the need to list each single address in the message heading. *Note 2:* Major relay stations usually transmit messages bearing collective-routing indicators to tributary, minor, and other major relay stations.

collimation: The process by which a divergent or convergent beam of electromagnetic radiation is converted into a beam with the minimum divergence or convergence possible for that system (ideally, a bundle of parallel rays). (188)

collimator: A device that renders divergent or convergent rays more nearly parallel. (188) *Note:* The degree of collimation (parallelism) should be stated.

collinear antenna array: An array of dipole antennas mounted in such a manner that every element of each antenna is in an extension, with respect to its long axis, of its counterparts in the other antennas in the array. *Note:* A collinear array is usually mounted vertically, in order to increase overall gain and directivity in the horizontal direction. When stacking dipole antennas in such a fashion, doubling their number will, with proper phasing, produce a 3-dB increase in directive gain.

collision: 1. In a data transmission system, the situation that occurs when two or more demands are made simultaneously on equipment that can handle only one

at any given instant. (188) **2.** In a computer, the situation that occurs when an attempt is made to store simultaneously two different data items at a given address that can hold only one of the items.

color errors: In video systems, distortion of hues in all or a portion of the received image.

color keying: *Synonym* **chroma keying.**

combat-net radio (CNR): A radio operating in a network that (a) provides a half-duplex circuit and (b) uses either a single radio frequency or a discrete set of radio frequencies when in a frequency hopping mode. (188) *Note:* CNRs are primarily used for push-to-talk-operated radio nets for command and control of combat, combat support, and combat service support operations among ground, sea, and air forces.

combinational logic element: A device having at least one output channel and one or more input channels, all characterized by discrete states, such that at any instant the state of each output channel is completely determined by the states of the input channels at the same instant.

combined communications: The common use of communications facilities by two or more military services, each belonging to a different nation. *Note:* Such use might be specified by a combined communications-electronics agency.

combined distribution frame (CDF): A distribution frame that combines the functions of main and intermediate distribution frames and contains both vertical and horizontal terminating blocks. (188) *Note 1:* The vertical blocks are used to terminate the permanent outside lines entering the station. Horizontal blocks are used to terminate inside plant equipment. This arrangement permits the association of any outside line with any desired terminal equipment. These connections are made either with twisted pair wire, normally referred to as jumper wire, or with optical fiber cables, normally referred to as jumper cables. *Note 2:* In technical control facilities, the vertical side may be used to terminate equipment as well as outside lines. The horizontal side is then used for jackfields and battery terminations.

combined station: In high-level data-link control (HDLC) operation, the station that is usually responsible for performing balanced link-level operations and that generates commands, interprets responses, interprets received commands, and generates responses.

combiner: *See* **maximal-ratio combiner.**

COMINT: *Acronym for* **communications intelligence.**

comma-free code: A code constructed so that any partial code word, beginning at the start of a code word but terminating prior to the end of that code word, is not a valid code word. *Note 1:* The comma-free property permits the proper framing of transmitted code words when (a) external synchronization is provided to identify the start of the first code word in a sequence of code words and (b) no uncorrected errors occur in the symbol stream. *Note 2:* Examples of comma-free are the variable-length Huffman codes. *Synonym* **prefix-free code.**

command: 1. An order for an action to take place. **2.** In data transmission, an instruction sent by the primary station instructing a secondary station to perform some specific function. (188) **3.** In signaling systems, a control signal. **4.** In computer programming, that part of a computer instruction word that specifies the operation to be performed. **5.** *Loosely*, a mathematical or logic operator.

command and control (C^2): The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. [JP1-A]

command and control (C^2) system: The facilities, equipment, communications, procedures, and personnel essential to a commander for planning, directing, and controlling operations of assigned forces pursuant to the missions assigned. [JP1]

command and control warfare (C^2W): The integrated use of operations security (OPSEC), military deception, psychological operations (PSYOP), electronic warfare (EW), and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary command and control capabilities, while protecting friendly command and control capabilities against such actions. *Note:* Command and control warfare applies across the operational continuum and all levels of conflict. C^2W is both offensive and defensive:
(a) **counter-C^2**: To prevent effective C^2 of adversary forces by denying information to, influencing, degrading, or destroying the adversary C^2 systems.
(b) **C^2-protection:** To maintain effective command and control of own forces by turning to friendly advantage or negating adversary efforts to deny information to, influence, degrade, or destroy the friendly C^2 system. [JP1]

command, control and communications (C^3): The capabilities required by commanders to exercise command and control of their forces. [JCS Pub 18, *Operations Security*, Dec. 1982.]

command, control, communications, computers, and intelligence (C^4I): The facilities, computer equipment, communications equipment, display devices, and intelligence systems necessary to support military operations.

command, control, communications, and computer systems (C^4S): Integrated systems of doctrine, procedures, organizational structures, personnel, equipment, facilities, and communications designed to support a commander's exercise of command and control, through all phases of the operational continuum. *Synonym* **C^4 systems.** [JP1]

command frame: In data transmission, a frame, containing a command, transmitted by a primary station.

command menu: A list of all the different commands that may be given to a computer or communications system by an operator. *Note:* Commands on a command menu may be selected by the operator by (a) using an electromechanical pointer, such as a light pen, (b) touching the display screen with a finger, (c) speaking to a voice-recognition system, or (d) positioning a cursor or reverse-video bar by using a keyboard or mouse, and depressing one or more keys on the keyboard or mouse.

command net: A communications network which connects an echelon of command with some or all of its subordinate echelons for the purpose of command and control. [JP1]

command protocol data unit: A protocol data unit (PDU) transmitted by a logical link control (LLC) sublayer in which the PDU command/response (C/R) bit is equal to "0".

comm center: *Synonym* **communications center.**

commercial carrier: *Synonym* **common carrier.**

commercial refile: In military communications systems, the processing of a message from (a) a given military network, such as a tape-relay network, a point-to-point telegraph network, a radio-telegraph network, or the DSN to (b) a commercial communications network. *Note:* Commercial refiling of a message will usually require a reformatting of the message, particularly the heading.

commit transaction: The application, *i.e.*, insertion, of information into any data repository of an integrated database management system in a distributed local communications network.

commonality: 1. A quality that applies to materiel or systems: (a) possessing like and interchangeable characteristics enabling each to be utilized, or operated and maintained by personnel trained on the others without additional specialized training; (b) having interchangeable repair parts and/or components; (c) applying to consumable items interchangeably equivalent without adjustment. **2.** Pertaining to equipment or systems that have the quality of one entity possessing like and interchangeable parts with another equipment or system entity. (188) **3.** Pertaining to system design in which a given part can be used in more than one place in the system, *i.e.*, subsystems and components have parts in common. *Note:* Examples of commonality include the use of a firing pin that fits in many

different weapons and the use of a light source that fits in many different types of fiber optic transmitters.

common battery: A single electrical power source used to energize more than one circuit, component, equipment, or system. (188) *Note 1:* A common battery is usually an electrolytic device and is usually centrally located to the equipment that it serves. *Note 2:* In many telecommunications applications, the common battery is at a nominal –48 vdc. *Note 3:* A central office common battery supplies power to operate all directly connected instruments. *Note 4: Common battery* may include one or more power conversion devices to transform commercial power to direct current, with an electrolytic battery floating across the output.

common-battery signaling: Signaling in which the signaling power of a telephone is supplied by the serving switch. (188) *Note:* In common-battery signaling, "talking power" may be supplied by common or local battery.

common carrier: In a telecommunications context, a telecommunications company that holds itself out to the public for hire to provide communications transmission services. *Note:* In the United States, such companies are usually subject to regulation by Federal and state regulatory commissions. *Synonyms* **carrier, commercial carrier, communications common carrier.**

common-channel interoffice signaling (CCIS): In multichannel switched networks, a method of transmitting all signaling information for a group of trunks by encoding it and transmitting it over a separate channel using time-division digital techniques.

common-channel signaling: In a multichannel communications system, signaling in which one channel in each link is used for signaling to control, account for, and manage traffic on all channels of the link. (188) *Note:* The channel used for common-channel signaling does not carry user information.

common control: An automatic switching arrangement in which the control equipment necessary for the establishment of connections is shared by being associated with a given call only during the period required to accomplish the control function for the given call. (188) *Note:* In common control, the channels that are used for signaling, whether frequency bands or time slots, are not used for message traffic.

common control switching arrangement (CCSA): An arrangement in which switching for a private network is provided by one or more common control switching systems. *Note:* The switching systems may be shared by several private networks and also may be shared with the public telephone networks.

common control system: An automatic switching system that makes use of common equipment to establish a connection. (188) *Note:* The common equipment then becomes available to establish other connections.

common equipment: Equipment used by more than one system, subsystem, component, or other equipment, such as a channel or switch. (188)

Common Management Information Protocol (CMIP): A protocol used by an application process to exchange information and commands for the purpose of managing remote computer and communications resources. (188)

common management information service (CMIS): A service that specifies the service interface to the Common Management Information Protocol (CMIP). (188) *Note:* To transfer management information between open systems using CMIS/CMIP, peer connections, *i.e.*, associations, must be established. This requires the establishment of an Application Layer association, a Session Layer connection, a Transport Layer connection, and, depending on supporting communications technology, Network Layer and Link Layer connections.

common-mode interference: 1. Interference that appears between signal leads, or the terminals of a measuring circuit, and ground. (188) **2.** A form of coherent interference that affects two or more elements of a network in a similar manner (*i.e.*, highly coupled) as distinct from locally generated noise or interference that is statistically independent between pairs of network elements.

common-mode rejection ratio (CMRR): The ratio of the common-mode interference voltage at the input of

a circuit, to the corresponding interference voltage at the output. (188)

common-mode voltage: 1. The voltage common to both input terminals of a device. (188) **2.** In a differential amplifier, the unwanted part of the voltage between each input connection point and ground that is added to the voltage of each original signal. *Synonym* **longitudinal voltage.**

common return: A return path that is common to two or more circuits and that serves to return currents to their source or to ground. (188)

common return offset: In a line or circuit, the dc potential difference between ground and the common return. (188)

common user: In communications systems, pertaining to communications facilities and services provided to essentially all users in the area served by the system, rather than to one user or to a relatively small number of users, such as a closed user group with outgoing access.

common user circuit: A circuit designated to furnish a communication service to a number of users. (188)

common user network: A system of circuits or channels allocated to furnish communication paths between switching centers to provide communication service on a common basis to all connected stations or subscribers. It is sometimes described as a general purpose network. [JP1]

communications: 1. Information transfer, among users or processes, according to agreed conventions. (188) **2.** The branch of technology concerned with the representation, transfer, interpretation, and processing of data among persons, places, and machines. *Note:* The meaning assigned to the data must be preserved during these operations.

communications blackout: 1. A cessation of communications or communications capability caused by a lack of power to a communications facility or equipment. **2.** A total lack of communications capability caused by propagation anomalies, *e.g.,* those present during strong auroral activity or during the reentry of a spacecraft into the Earth's atmosphere.

communications center: 1. An agency charged with the responsibility for handling and controlling communications traffic. The center normally includes message center, transmitting, and receiving facilities. [JP1] **2.** A facility that (a) serves as a node for a communications network, (b) is equipped for technical control and maintenance of the circuits originating, transiting, or terminating at the node, (c) may contain message-center facilities, and (d) may serve as a gateway. (188) *Synonym* **comm center.**

communications channel: *See* **channel.**

communications common carrier: *Synonym* **common carrier.**

communications deception: 1. Deliberate transmission, retransmission, or alteration of communications to mislead an adversary's interpretation of the communications. [NIS] **2.** Use of devices, operations, and techniques with the intent of confusing or misleading the user of a communications link or a navigation system. [JP1]

communications-electronics (C-E): The specialized field concerned with the use of electronic devices and systems for the acquisition or acceptance, processing, storage, display, analysis, protection, disposition, and transfer of information. (188) *Note:* C-E includes the wide range of responsibilities and actions relating to (a) electronic devices and systems used in the transfer of ideas and perceptions, (b) electronic sensors and sensory systems used in the acquisition of information devoid of semantic influence, and (c) electronic devices and systems intended to allow friendly forces to operate in hostile environments and to deny to hostile forces the effective use of electromagnetic resources.

communications intelligence (COMINT): Technical and intelligence information derived from foreign communications by other than the intended recipients. [JP1]

communications jamming (COMJAM): 1. The portion of electronic jamming that is directed against communications circuits and systems. **2.** The prevention of successful radio communications by the use of electromagnetic signals, *i.e.,* the deliberate radiation, reradiation, or reflection of electromagnetic energy with the objective of impairing the effective

use of electronic communications systems. *Note:* The aim of communications jamming is to prevent communications by electromagnetic means, or at least to degrade communications sufficiently to cause delays in transmission and reception. Jamming may be used in conjunction with deception to achieve an overall electronic-countermeasure (ECM) plan implementation.

communications net: An organization of stations capable of direct communication on a common channel or frequency. [JP1] *Synonym* **net.**

communications net operation: *See* **net operation.**

communications network: An organization of stations capable of intercommunications but not necessarily on the same channel. [JP1]

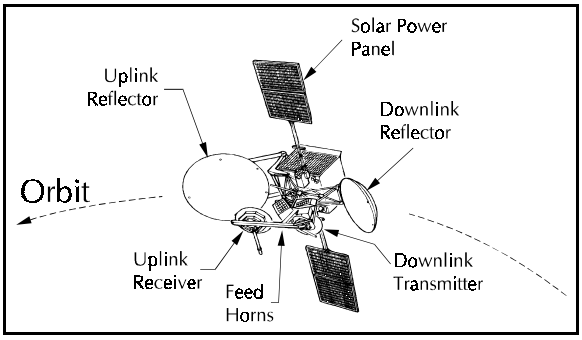
communications processor unit (CPU): A computer embedded in a communications system. *Note 1:* An example of a CPU is the message data processor of a DDN switching center. (188) *Note 2: CPU* is also an abbreviation for *central processing unit* of a computer.

communications protection: The application of communications security (COMSEC) measures to telecommunications systems in order (a) to deny unauthorized persons access to sensitive unclassified information of value, (b) to prevent disruption of telecommunications services, or (c) to ensure the authenticity of information handled by telecommunications systems.

communications protocol: *See* **protocol.**

communications reliability: The probability that information transmitted from a communications station will arrive at the intended destination in a timely manner without loss of content.

communications satellite: An orbiting vehicle that relays signals between (a) terrestrial communications stations, (b) a terrestrial communications station and another communications satellite, or (c) other communications satellites.



communications satellite

communications saturation: *See* **saturation.**

communications security (COMSEC): Measures and controls taken to deny unauthorized persons information derived from telecommunications and ensure the authenticity of such telecommunications. *Note:* Communications security includes cryptosecurity, transmission security, emission security, and physical security of COMSEC material. [NIS] (188)
(a) cryptosecurity: [The] component of communications security that results from the provision of technically sound cryptosystems and their proper use. [NIS]
(b) emission security: Protection resulting from all measures taken to deny unauthorized persons information of value which might be derived from intercept and analysis of compromising emanations from crypto-equipment, AIS, and telecommunications systems. [NIS]
(c) physical security: The component of communications security that results from all physical measures necessary to safeguard classified equipment, material, and documents from access thereto or observation thereof by unauthorized persons. [JP1]
(d) transmission security: [The] component of communications security that results from the application of measures designed to protect transmissions from interception and exploitation by means other than cryptanalysis. [NIS]

communications security equipment: *See* **COMSEC equipment.**

communications security material: *See* **COMSEC material.**

communications silence: The avoidance of any type of transmission, emission, or radiation by any means, including radiation from receiving equipment. *Note:* An example of communications silence is the maintaining of a listening watch only if the receivers do not radiate beyond a specified level.

communications sink: *See* **sink.**

communications source: *See* **source.**

communications subsystem: A functional unit or operational assembly that is smaller than the larger assembly under consideration. (188) *Note:* Examples of communications subsystems in the Defense Communications System (DCS) are (a) a satellite link with one Earth terminal in CONUS and one in Europe, (b) the interconnect facilities at each Earth terminal of the satellite link, and (c) an optical fiber cable with its driver and receiver in either of the interconnect facilities.

communications survivability: The ability of communications systems to continue to operate effectively under adverse conditions, though portions of the system may be damaged or destroyed. *Note:* Various methods may be used to maintain communications services, such as using alternate routing, different transmission media or methods, redundant equipment, and sites and equipment that are radiation hardened.

communications system: A collection of individual communications networks, transmission systems, relay stations, tributary stations, and data terminal equipment (DTE) usually capable of interconnection and interoperation to form an integrated whole. (188) *Note:* The components of a communications system serve a common purpose, are technically compatible, use common procedures, respond to controls, and operate in unison.

communications system engineering: The translation of user requirements for the exchange of information into cost-effective and low-risk technical solutions in terms of equipment and subsystems. (188) *Note:* Communications system engineering encompasses the integration of these parts into a complete entity resulting in a minimum investment for the entire system lifecycle required to satisfy the requirements of a majority of users of the communication system.

communications system survivability: *See* **survivability.**

communications theory: Theory that is devoted to the probabilistic characteristics of the transmission of data in the presence of noise, and that is used to advance the design, development, and operation of communications systems.

communications watch: The monitoring of one or more communications lines, frequencies, or channels to obtain information by listening to or receiving all transmissions on them and transmitting and receiving messages as required.

communications zone: [The] rear part of theater of operations (behind but contiguous to the combat zone), which contains the lines of communications, establishments for supply and evacuation, and other agencies required for the immediate support and maintenance of the field forces. [JP1]

community antenna television (CATV): *See* **cable TV**.

community of interest: A grouping of users who generate a majority of their traffic in calls to other members of the group. *Note:* The community of interest may be related to a geographic area or to an administrative organization. *Synonym* **special interest group.**

community reception (in the broadcasting-satellite service): The reception of emissions from a space station in the broadcasting-satellite service by receiving equipment, which in some cases may be complex and have antennae larger than those used for individual reception, and intended for use:

- by a group of the general public at one location; or
- through a distribution system covering a limited area. [NTIA] [RR]

compact: *See* **data compaction.**

compact disk read-only memory: *See* **CD ROM.**

compaction: *See* **data compaction.**

companding: An operation in which the dynamic range of signals is compressed before transmission and is expanded to the original value at the receiver. (188) *Note:* The use of companding allows signals with a large dynamic range to be transmitted over facilities that have a smaller dynamic range capability. Companding reduces the noise and crosstalk levels at the receiver.

compandor: A device that incorporates a compressor and an expander, each of which may be used independently. (188)

comparably efficient interconnection (CEI): An equal-access concept developed by the FCC stating that, ". . . if a carrier offers an enhanced service, it should be required to offer network interconnection (or collocation) opportunities to others that are comparably efficient to the interconnection that its enhanced service enjoys. Accordingly, a carrier would be required to implement CEI only as it introduces new enhanced services." [FCC *Report and Order* June 16, 1986]

comparator: 1. In analog computing, a functional unit that compares two analog variables and indicates the result of that comparison. **2.** A device that compares two items of data and indicates the result of that comparison. **3.** A device for determining the dissimilarity of two items such as two pulse patterns or words.

compartmentation: The segregation of components, programs, and information to provide isolation. *Note:* Compartmentation provides some protection against overall compromise, contamination, or unauthorized access.

compatibility: 1. Capability of two or more items or components of equipment or material to exist or function in the same system or environment without mutual interference. [JP1] (188) **2.** In computing, the ability to execute a given program on different types of computers without modification of the program or the computers. **3.** The capability that allows the substitution of one subsystem (storage facility), or of one functional unit (*e.g.*, hardware, software), for the originally designated system or functional unit in a relatively transparent manner, without loss of information and without the introduction of errors.

compatible sideband transmission: Independent sideband transmission in which the carrier is deliberately reinserted at a lower level after its normal suppression to permit reception by conventional AM receivers. (188) *Note:* Compatible sideband transmission is usually single-sideband (SSB) amplitude-modulation-equivalent (AME) transmission consisting of the emission of the carrier plus the upper sideband. *Synonym* **amplitude modulation equivalent.**

compelled signaling: Signaling in which the transmission of each signal in the forward direction from an originating terminal is inhibited until an acknowledgement of the satisfactory receipt of the previous signal is received by the originating terminal.

competitive access provider (CAP): A company that provides exchange access services in competition with an established U.S. telephone local exchange carrier.

competitive clip: In time-assignment speech interpolation (TASI) or digital speech interpolation (DSI), truncation of the initial part of a speech spurt, caused when all channels in a given direction of transmission are busy and the transmission of the spurt must wait for an available channel.

compile: 1. To translate a computer program expressed in a high-level language into a program expressed in a lower level language, such as an intermediate language, assembly language, or a machine language. **2.** To prepare a machine language program from a computer program written in another programming language by making use of the overall logic structure of the program or by generating more than one computer instruction for each symbolic statement as well as performing the function of an assembler.

compiler: A computer program for compiling. *Synonym* **compiling program.**

compiling program: *Synonym* **compiler.**

complementary network service (CNS): A means for an enhanced-service provider customer to connect to a network and to the enhanced service provider.

Note: Complementary network services usually consist of the customer local service, such as a business or residence, and several associated service features, such as a call-forwarding service.

component: 1. An assembly, or part thereof, that is essential to the operation of some larger assembly and is an immediate subdivision of the assembly to which it belongs. (188) *Note:* For example, a radio receiver may be a component of a complete radio set consisting of a combined transmitter-receiver, *i.e.,* a transceiver. The same radio receiver could also be a subsystem of the combined transmitter-receiver, in which case the IF amplifier section would be a component of the receiver but not of the radio set. Similarly, within the IF amplifier section, items, such as resistors, capacitors, vacuum tubes, and transistors, are components of that section. **2.** In logistics, a part, or combination of parts having a specified function, that can only be installed or replaced as an entity. [JP1]. **3.** In material, an assembly or any combination of parts, subassemblies, and assemblies mounted together in manufacture, assembly, maintenance, or rebuild. [JP1-A]

composite cable: A communications cable having both optical and metallic signal-carrying components. *Note 1:* A cable having optical fiber(s) and a metallic component, *e.g.,* a metallic twisted pair, used solely for conduction of electric power to repeaters, does qualify as a composite cable. *Note 2:* A cable having optical fiber(s) , plus a metallic strength member or armor, does not qualify as a composite cable. *Contrast with* **hybrid cable.**

composited circuit: A circuit that can be used simultaneously either for telephony and dc telegraphy or for telephony and signaling. *Note:* Separation of the two may be accomplished by frequency discrimination. *Synonym* **voice-plus circuit.**

composite signaling (CX): Signaling in which an arrangement is made to provide direct current signaling and dial pulsing beyond the range of conventional loop signaling. (188) *Note:* Composite signaling, like DX signaling, permits duplex operation, *i.e.,* permits simultaneous two-way signaling. *Synonym* **CX signaling.**

composite two-tone test signal: A test signal composed of two different frequencies and used for intermodulation distortion measurements. (188)

composite video: In television, a video signal in which synchronizing information (pulses) and picture information, including chroma, *i.e.*, color, information are combined.

compound signal: In ac signaling, a signal consisting of the simultaneous transmission of more than one frequency. *Note:* An example of compound signaling is dual-tone multifrequency (DTMF) signaling.

compress: *See* **data compaction, data compression, signal compression.**

compressed video: Video that has been encoded so as to reduce the number of bits required for storage or transmission.

compression: *See* **data compression, signal compression.**

compression ratio: 1. In signal compression, the ratio of the dynamic range of compressor input signals to the dynamic range of the compressor output signals. *Note:* The compression ratio is usually expressed in dB. For example, a 40-dB input range compressed to a 30-dB output range would be equivalent to a 10-dB compression. **2.** In digital facsimile, the ratio of the total pels scanned for the object to the total encoded bits sent for picture information. **3.** The ratio of the gain of a device at a low power level to the gain at some higher level. *Note:* The compression ratio is usually expressed in dB.

compressor: A nonlinear analog device that has a lower gain at higher input levels than at lower input levels. *Note:* A compressor is used to allow signals with a large dynamic range to be sent through devices or circuits with a smaller dynamic range .

compromise: 1. The known or suspected exposure of clandestine personnel, installations, or other assets or of classified information or material, to an unauthorized person. [JP1] **2.** The disclosure of cryptographic information to unauthorized persons. **3.** The recovery of plain text of encrypted messages by unauthorized persons through cryptanalysis methods. **4.** The disclosure of information or data to

unauthorized persons, or a violation of the security policy of a system in which unauthorized intentional or unintentional disclosure, modification, destruction, or loss of an object may have occurred. [NIS]

compromising emanations: Unintentional signals that, if intercepted and analyzed would disclose the information transmitted, received, handled, or otherwise processed by telecommunications or automated systems equipment. [NIS] (188)

computer: 1. A device that accepts data, processes the data in accordance with a stored program, generates results, and usually consists of input, output, storage, arithmetic, logic, and control units. (188) **2.** A functional unit that can perform substantial computation, including numerous arithmetic operations or logic operations, without human intervention during a run. *Note 1:* This definition, approved by the Customs Council, distinguishes a computer from similar devices, such as hand-held calculators and certain types of control devices. *Note 2:* Computers have been loosely classified into microcomputers, minicomputers, and main-frame computers, based on their size. These distinctions are rapidly disappearing as the capabilities of even the smaller units have increased. Microcomputers now are usually more powerful and versatile than the minicomputers and the main-frame computers were a few years ago.

computer-aided software engineering: *See* **CASE.**

computer-aided systems engineering: *See* **CASE.**

computer architecture: Of a computer, the physical configuration, logical structure, formats, protocols, and operational sequences for processing data, controlling the configuration, and controlling the operations. *Note:* Computer architecture may also include word lengths, instruction codes, and the interrelationships among the main parts of a computer or group of computers.

computer conferencing: 1. Teleconferencing supported by one or more computers. **2.** An arrangement in which access, by multiple users, to a common database is mediated by a controlling computer. **3.** The interconnection of two or more computers working in a distributed manner on a common application process. (188)

computer-dependent language: *Synonym* **assembly language.**

computer graphics: 1. Graphics implemented through the use of computers. **2.** Methods and techniques for converting data to or from graphic displays via computers. **3.** The branch of science and technology concerned with methods and techniques for converting data to or from visual presentation using computers.

computer language: *Synonym* **programming language.**

computer network: 1. A network of data processing nodes that are interconnected for the purpose of data communication. **2.** A communications network in which the end instruments are computers. (188)

computer network engineering: *See* **network engineering (def. # 2).**

computer network operating system (NOS): A specialized operating system designed for computer networking on minicopmputers and microcomputers in a local networking area / campus area network. *Note:* A NOS is usually designed to run on existing software designed for that computer and may require interface hardware for the workstation and server.

computer-oriented language: A programming language in which words and syntax are designed for use on a specific computer or class of computers. (188) *Synonyms* **low-level language, machine-oriented language.**

computer peripheral: *See* **peripheral equipment.**

computer program: *See* **program.**

computer program origin: The address assigned to the initial storage location of a computer program in main storage.

computer routine: *See* **routine.**

computer science: The discipline that is concerned with methods and techniques relating to data processing performed by automatic means.

computer security (COMPUSEC): 1. Measures and controls that ensure confidentiality, integrity, and availability of the information processed and stored by a computer. [NIS] *Synonym* **automated information systems security. 2.** The application of hardware, firmware and software security features to a computer system in order to protect against, or prevent, the unauthorized disclosure, manipulation, deletion of information or denial of service. (AC/35(WG/1)WP(88)4-7) [NATO]

computer system: A functional unit, consisting of one or more computers and associated software, that (a) uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program, (b) executes user-written or user-designated programs, and (c) performs user-designated data manipulation, including arithmetic and logic operations. *Note:* A computer system may be a stand-alone system or may consist of several interconnected systems. *Synonyms* **ADP system, computing system.**

computer system fault tolerance: The ability of a computer system to continue to operate correctly even though one or more of its components are malfunctioning. *Note:* System performance, such as speed and throughput, may be diminished until the faults are corrected. *Synonym* **computer system resilience.**

computer system resilience: *Synonym* **computer system fault tolerance.**

computer systems engineering: *See* **systems design.**

computer word: In computing, a group of bits or characters that occupies one or more storage locations and is treated by computers as a unit. (188) *Synonym* **machine word.**

computing system: *Synonym* **computer system.**

COMSEC: *Acronym for* **communications security.**

COMSEC equipment: Equipment designed to provide security to telecommunications by converting information to a form unintelligible to an unauthorized interceptor and, subsequently, by reconverting such information to its original form for authorized recipients; also, equipment designed specifically to aid in, or as an essential element of, the conversion process. *Note:* COMSEC equipment includes crypto-equipment, crypto-ancillary equipment, cryptoproduction equipment, and authentication equipment. [NIS]

COMSEC material: [An] item designed to secure or authenticate telecommunications. *Note:* COMSEC material includes, but is not limited to, key, equipment, devices, documents, firmware or software that embodies or describes cryptographic logic and other items that perform COMSEC functions. [NIS]

concentrator: 1. In data transmission, a functional unit that permits a common path to handle more data sources than there are channels currently available within the path. *Note:* A concentrator usually provides communication capability between many low-speed, usually asynchronous channels and one or more high-speed, usually synchronous channels. Usually different speeds, codes, and protocols can be accommodated on the low-speed side. The low-speed channels usually operate in contention and require buffering. **2.** A device that connects a number of circuits, which are not all used at once, to a smaller group of circuits for economy. (188)

concentricity error: In an optical fiber, the distance between the center of the two concentric circles that specify the cladding diameter and the center of the two concentric circles that specify the core diameter. *Note:* The concentricity error is used in conjunction with tolerance fields to specify or characterize optical fiber core and cladding geometry. *Synonyms* **core eccentricity, core-to-cladding concentricity, core-to-cladding eccentricity, core-to-cladding offset.**

concurrent operation: 1. *Synonym* **multitasking. 2.** In data link operations, the operation in which two or more data links are used during the same, usually short, time interval, while adhering to the protocols of each link without providing data forwarding among the links.

conditioned baseband representation: *Synonym* **non-return-to-zero mark.**

conditioned circuit: A communications circuit optimized to obtain desired characteristics for voice or data transmission. (188)

conditioned diphase modulation: A form of diphase modulation, combined with signal conditioning, that (a) eliminates the dc component of the signal, (b) enhances timing recovery, and (c) facilitates transmission over voice frequency (VF) circuits or coaxial cables. (188)

conditioned loop: A loop that has conditioning equipment to obtain the desired line characteristics for voice or data transmission. (188) *Note:* The conditioning equipment is used to improve the amplitude-vs.-frequency characteristics of the circuit and to match impedance.

conditioning equipment: 1. At junctions of circuits, equipment used to obtain desired circuit characteristics, such as matched transmission levels, matched impedances, and equalization between facilities. (188) **2.** Corrective networks used to improve data transmission, such as equalization of the insertion-loss-vs.-frequency characteristic and the envelope delay distortion over a desired frequency range.

conducted interference: 1. Interference resulting from noise or unwanted signals entering a device by conductive coupling, *i.e.,* by direct coupling. (188) **2.** An undesired voltage or current generated within, or conducted into, a receiver, transmitter, or associated equipment, and appearing at the antenna terminals. (188)

conduction band: 1. In a semiconductor, the range of electron energy, higher than that of the valence band, sufficient to make the electrons free to move from atom to atom under the influence of an applied electric field and thus constitute an electric current. **2.** In the atomic structure of a material, a partially filled or empty energy level in which electrons are free to move, thus allowing the material to conduct an electrical current upon application of an electric field by means of an applied voltage.

conductive coupling: Energy transfer achieved by means of physical contact, *i.e.,* coupling other than inductive or capacitive coupling. (188) *Note 1:* Conductive coupling may be achieved by wire, resistor, or common terminal, such as a binding post or metallic bonding. *Note 2:* Conductive coupling passes the full spectrum of frequencies, including dc. *Synonym* **direct coupling.**

cone of silence: *Synonym* **antenna blind cone.**

CONEX: *Acronym for* **connectivity exchange.**

conference call: A service feature that allows a call to be established among three or more stations in such a manner that each of the stations is able to communicate with all the other stations. (188) *Synonym* **multiple call.**

conference operation: In a communications network, operation that allows a call to be established among three or more stations in such a manner that each of the stations is able to communicate directly with all the other stations. (188) *Note:* In radio systems, the stations may receive simultaneously, but must transmit one at a time. The common operational modes are “push-to-talk” for telephone operation and “push-to-type” for telegraph and data transmission.

configuration: In a communications or computer system, an arrangement of functional units according to their nature, number, and chief characteristics. *Note 1:* Configuration pertains to hardware, software, firmware, and documentation. *Note 2:* The configuration will affect system performance.

configuration control: 1. After establishing a configuration, such as that of a telecommunications or computer system, the evaluating and approving changes to the configuration and to the interrelationships among system components. **2.** In distributed-queue dual-bus (DQDB) networks, the function that ensures the resources of all nodes of a DQDB network are configured into a correct dual-bus topology. *Note:* The functions that are managed include the head of bus, external timing source, and default slot generator functions.

configuration management: 1. [The] management of security features and assurances through control of changes made to hardware, software, firmware, documentation, test, test fixtures and test documentation of an automated information system,

throughout the development and operational life of a system. [NIS] **2.** The control of changes—including the recording thereof—that are made to the hardware, software, firmware, and documentation throughout the system lifecycle.

confirmation signaling: Signaling that ensures error-free transmission of dialed information by returning a unique digit-dependent signal from the far end as each digit is sent over a trunk. (188)

confirmation to receive: In facsimile, a signal from a CCITT Group 1, 2, or 3 facsimile receiver, indicating it is ready to receive picture signals.

conformance test: A test performed by an independent body to determine if a particular piece of equipment satisfies the criteria in a specified controlling document, such as a Federal standard, an American National Standard, a Military Standard, or a Military Specification. *Contrast with* **acceptance test.**

congestion: 1. In a communications switch, a state or condition that occurs when more subscribers attempt simultaneously to access the switch than it is able to handle, even if unsaturated. (188) **2.** In a saturated communications system, the condition that occurs when an additional demand for service occurs. (188)

connecting arrangement: In the public switched telephone networks, the equipment provided by a common carrier to accomplish electrical interconnection between customer-provided equipment and the facilities of the common carrier.

connection: 1. A provision for a signal to propagate from one point to another, such as from one circuit, line, subassembly, or component to another. **2.** An association established between functional units for conveying information.

connection-in-progress signal: A call control signal at the data circuit-terminating-equipment/data-terminal-equipment (DCE/DTE) interface that indicates to the DTE that the establishment of the data connection is in progress and that the ready-for-data signal will follow.

connectionless data transfer: *See* **connectionless mode transmission**.

connectionless mode transmission: In a packet-switched network, transmission in which each packet is encoded with a header containing a destination address sufficient to permit the independent delivery of the packet without the aid of additional instructions. *Note 1:* A packet transmitted in a connectionless mode is frequently called a datagram. *Note 2:* In connectionless mode transmission of a packet, the service provider usually cannot guarantee there will be no loss, error insertion, misdelivery, duplication, or out-of-sequence delivery of the packet. However, the risk of these hazards' occurring may be reduced by providing a reliable transmission service at a higher protocol layer, such as the Transport Layer of the Open Systems Interconnection—Reference Model.

connectionless transmission: *See* **connectionless-mode transmission.**

connection-mode transmission: *See* **connection-oriented mode transmission.**

connection-oriented data transfer protocol: A data-transfer protocol in which a logical connection is established between end user terminals.

connection-oriented mode transmission: In a packet-switched network, a mode of transmission in which there is a complete information transfer transaction for each packet or group of packets, *i.e.*, the information transfer phase is preceded by an access phase and followed by a disengagement phase. *Note 1:* During the information transfer phase of connection-oriented mode transmission, more than one packet may be transmitted. The header of each information packet contains a sequence number and an identifier field that associates the packet with the connection that was established during the access phase before the information transfer phase begins. *Note 2:* Connection-oriented mode transmission usually enables detection of lost, erroneous, duplicated, or out-of-sequence packets because a connection is established from end to end before transmission begins. *Note 3:* The CCITT X.25 protocols are widely used to implement connection-oriented mode transmission on packet-switched public data networks. The protocols are implemented at

Layers 1, 2, and 3 of the Open Systems Interconnection—Reference Model.

connections per circuit hour (CCH): **1.** A unit of traffic measurement expressed as the number of connections established at a switching point per hour. (188) **2.** A unit of traffic measurement used to express the rate at which circuits are established at a switch. *Note:* The magnitude of the CCH is an instantaneous value subject to change as a function of time, *i.e.*, from moment to moment.

connectivity exchange (CONEX): In an adaptive or manually operated high-frequency (HF) radio network, the automatic or manual exchange of information concerning routes to stations that are not directly reachable by the exchange originator. *Note:* The purpose of the exchange is to identify indirect paths and/or possible relay stations to those stations that are not directly reachable.

connector: A device for mating and demating electrical power connections or communications media. (188) *Note:* A connector is distinguished from a splice, which is a permanent joint.

conservation of radiance: A basic principle of optics, that no passive optical system can increase the quantity L/n^2, where L is the radiance of a beam and n is the local refractive index. (188) *Note: "Conservation of radiance"* was formerly called *"conservation of brightness"* or the *"brightness theorem."*

consolidated local telecommunications service: Local communications service provided by GSA to all Federal agencies located in a building, complex, or geographical area.

consultation hold: A service feature that allows a speaker on an extension instrument to place one call on hold and to speak with another caller on a separate line.

content-addressable storage: *Synonym* **associative storage (def. #1).**

contention: **1.** A condition that arises when two or more data stations attempt to transmit at the same time over a shared channel, or when two data stations attempt to transmit at the same time in two-way alternate communication. *Note:* A contention can occur in data communications when no station is designated a master station. In contention, each station must monitor the signals and wait for a quiescent condition before initiating a bid for master status. **2.** Competition by users of a system for use of the same facility at the same time. (188)

continuity check: A check made of a circuit to verify that a communication or power path exists. (188)

continuously variable slope delta (CVSD) modulation: A type of delta modulation in which the size of the steps of the approximated signal is progressively increased or decreased as required to make the approximated signal closely match the input analog wave. (188)

continuous operation: **1.** Operation in which certain components, such as nodes, facilities, circuits, or equipment, are in an operational state at all times. (188) *Note:* Continuous operation usually requires that there be fully redundant configuration, or at least a sufficient X out of Y degree of redundancy for compatible equipment, where X is the number of spare components and Y is the number of operational components. **2.** In data transmission, operation in which the master station need not stop for a reply from a slave station after transmitting each message or transmission block.

continuous presence: In teleconferencing, the concurrent presence of two or more video images, such as two images that may appear on a single monitor on a split screen or on two separate monitors.

continuous tone copy: In facsimile, an object, *i.e.*, an original, or a recorded copy, that contains shades of gray, *i.e.*, contains densities between black and white, such as in a photographic print. (188)

continuous wave (cw): A wave of constant amplitude and constant frequency. (188)

contouring: In digital facsimile, density step lines in the recorded copy resulting from analog-to-digital conversion when the object, *i.e.*, the original, has observable shades of gray between the smallest density steps of the digital system.

contrast: 1. In display systems, the relation between (a) the intensity of color, brightness, or shading of an area occupied by a display element, display group, or display image on the display surface of a display device and (b) the intensity of an area not occupied by a display elements, a display group, or a display image. *Deprecated synonym* **brightness ratio. 2.** In optical character recognition, the difference between color or shading of the printed material on a document and the background on which it is printed.

contribution: In B-ISDN applications, the use of broadband transmission of audio or video information to the user for post-production processing and distribution.

control ball: *Synonym* **trackball.**

control character: A character that initiates, modifies, or stops a function, event, operation, or control operation. (188) *Note:* Control characters may be recorded for use in subsequent actions. They are not graphic characters but may have a graphic representation in some circumstances.

control communications: The branch of technology devoted to the design, development, and application of communications facilities used specifically for control purposes, such as for controlling (a) industrial processes, (b) movement of resources, (c) electric power generation, distribution, and utilization, (d) communications networks, and (e) transportation systems.

control field: In a protocol data unit (PDU), the field that (a) contains data interpreted by the receiving destination logical-link controller (LLC) and (b) may be the field immediately following the destination service access point (DSAP) and source service access point (SSAP) address fields of the PDU.

control function: *Synonym* **control operation.**

controlled access: Access in which the resources of an area or system is limited to authorized personnel, users, programs, processes, or other systems, and denied to all others. (188)

controlled area: 1. An area (a) in which uncontrolled movement will not result in compromise of classified information, (b) that is designed to provide administrative control and safety, or (c) that serves as a buffer for controlling access to limited-access areas. **2.** An area to which security controls have been applied to protect an information-processing system's equipment and wirelines, equivalent to that required for the information transmitted through the system. (188)

controlled not-ready signal: A signal, sent in the backward direction, to indicate that a call cannot be completed because the called line is not in a ready condition, but is under control, as opposed to not being in a ready condition and not under control.

controlled security mode: *See* **controlled security operation.**

controlled security operation: In a communications system, operation in which (a) internal security controls prevent inadvertent disclosures, (b) personnel, physical, and administrative controls are used to prevent unauthorized access, (c) both cleared and uncleared users are serviced, and (d) if required, both secured and unsecured remote terminal areas are serviced. (188)

controlled space: Three-dimensional space surrounding telecommunications and automated information systems equipment, within which unauthorized persons are denied unrestricted access and are either escorted by authorized persons or are under continuous physical or electronic surveillance. *Synonym* **restricted area.** [NIS]

controller: In an automated radio, the device that commands the radio transmitter and receiver, and that performs processes, such as automatic link establishment, channel scanning and selection, link quality analysis, polling, sounding, message store and forward, address protection, and anti-spoofing.

control of electromagnetic radiation: 1. Measures taken to minimize unintended electromagnetic radiation emanating from a system or component and to minimize electromagnetic interference. *Note:* Control of electromagnetic radiation is exercised for purposes of security and the reduction of interference, especially on ships and aircraft. **2.** A national operational plan to minimize the use of

electromagnetic radiation in the United States and its possessions and the Panama Canal Zone in the event of attack or imminent threat thereof, as an aid to the navigation of hostile aircraft, guided missiles, or other devices.

control operation: An operation that affects the recording, processing, transmission, or interpretation of data. *Note:* Examples of control operations include starting and stopping a process; executing a carriage return, a font change, or a rewind; and transmitting an end-of-transmission (EOT) control character. *Synonym* **control function.**

control station: In a communications network, the station that selects the master station and supervises operational procedures, such as polling, selecting, and recovery. *Note:* The control station has the overall responsibility for the orderly operation of the entire network.

conversational mode: A mode of communication analogous to a conversation between two persons.

conversational service: In telecommunications, a service that provides two-way, interactive, real-time, end-to-end information transfer.

convolutional code: A type of error-correction code in which (a) each *m*-bit information symbol (each *m*-bit string) to be encoded is transformed into an *n*-bit symbol, where $n>m$ and (b) the transformation is a function of the last *k* information symbols, where *k* is the constraint length of the code. *Note:* Convolutional codes are often used to improve the performance of radio and satellite links.

convoy internal communications: In a land or maritime convoy, communications (a) that is among the elements of the convoy, (b) includes radio, visual, and sound transmissions, (c) in which radio intervehicle or intership communications are usually by radiotelephone using the receipt method of operation, (d) in which the convoy commander vehicle or ship usually has the net-control station aboard and (e) that usually use a single assigned frequency.

cooperation factor: In facsimile systems, the product of the total scanning length and the scanning density, given by $CF = L\sigma$, where *L* is the scanning line length and σ is the scanning line density, both in compatible units. *Note:* For example, a 20-cm line and a line density of 6 scanning pitches per centimeter would yield a cooperation factor of 120.

coordinated clock: One of a set of clocks distributed over a spatial region, producing time scales that are synchronized to the time scale of a reference clock at a specified location. (188)

coordinated time scale: A time scale synchronized within given tolerances to a reference time scale. (188)

Coordinated Universal Time (UTC): Time scale, based on the second (SI), as defined and recommended by the CCIR, and maintained by the Bureau International des Poids et Mesures (BIPM). For most practical purposes associated with the *Radio Regulations*, UTC is equivalent to mean solar time at the prime meridian (0^o longitude), formerly expressed in GMT. [NTIA] [RR] *Note 1:* The maintenance by BIPM includes cooperation among various national laboratories around the world. *Note 2:* The full definition of UTC is contained in CCIR Recommendation 460-4. (188) *Note 3*: The second was formerly defined in terms of astronomical phenomena. When this practice was abandoned in order to take advantage of atomic resonance phenomena ("atomic time") to define the second more precisely, it became necessary to make occasional adjustments in the "atomic" time scale to coordinate it with the workaday mean solar time scale, UT-1, which is based on the somewhat irregular rotation of the Earth. Rotational irregularities usually result in a net decrease in the Earth's average rotational velocity, and ensuing lags of UT-1 with respect to UTC. *Note 4:* Adjustments to the atomic, *i.e.*, UTC, time scale consist of an occasional addition or deletion of one full second, which is called a *leap second*. Twice yearly, during the last minute of the day of June 30 and December 31, Universal Time, adjustments may be made to ensure that the accumulated difference between UTC and UT-1 will not exceed 0.9 s before the next scheduled adjustment. Historically, adjustments, when necessary, have usually consisted of adding an extra second to the UTC time scale in order to allow the rotation of the Earth to "catch up." Therefore, the last minute of the UTC time scale, on the day when an adjustment is made, will have 59 or

61 seconds. *Synonyms* **World Time, Z Time, Zulu Time.**

coordination area: The area associated with an Earth station outside of which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level. [NTIA] [RR]

coordination contour: **1.** The line enclosing the coordination area. [NTIA] [RR] **2.** The perimeter of the coordination area.

coordination distance: Distance on a given azimuth from an Earth station beyond which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level. [NTIA] [RR]

copy: **1.** To receive a message. **2.** A recorded message or a duplicate of it. **3.** To read data from a source, leaving the source data unchanged at the source, and to write the same data elsewhere, though they may be in a physical form that differs from that of the source. **4.** To understand a transmitted message.

copy-protected: Of a data medium such as a diskette, pertaining to the use of one or more schemes designed to thwart copying in violation of copyright law or security considerations.

copy watch: A radio- or video-communications watch in which an operator is required to maintain a continuous receiver watch and to keep a complete log.

cord circuit: A switchboard circuit in which a plug-terminated cord is used to establish connections manually between user lines or between trunks and user lines. (188) *Note:* A number of cord circuits are furnished as part of the switchboard position equipment. The cords may be referred to as front cord and rear cord or trunk cord and station cord. In modern cordless switchboards, the cord-circuit function is switch operated and may be programmable.

cord lamp: The lamp associated with a cord circuit that indicates supervisory conditions for the respective part of the connection.

cordless switchboard: A telephone switchboard in which manually operated keys are used to make connections. (188)

core: **1.** The central region about the longitudinal axis of an optical fiber, which region supports guiding of the optical signal. (188) *Note 1:* For the fiber to guide the optical signal, the refractive index of the core must be slightly higher than that of the cladding. *Note 2:* In different types of fibers, the core and core-cladding boundary function slightly differently in guiding the signal. Especially in single-mode fibers, a significant fraction of the energy in the bound mode travels in the cladding. **2.** A piece of ferromagnetic material, usually toroidal in shape, used as a component in a computer memory device. *Note:* The type of memory referred to has very limited application in today's computer environment. It has been largely replaced by semiconductor and other technologies. **3.** The material at the center of an electromechanical relay or solenoid, about which the coil is wound. (188)

core area: The part of the cross-sectional area of an optical fiber within which the refractive index is everywhere greater than that of the innermost homogeneous cladding, by a specified fraction of the difference between the maximum refractive index of the core and the refractive index of the innermost cladding. *Note 1:* Artifacts of the manufacturing process, such as refractive index dip, are ignored in computing the points (refractive indices) of demarcation. *Note 2:* The core area is the cross-sectional area within which the refractive index is given by

$$n_3 > \left[n_2 + m(n_1 - n_2) \right] ,$$

where n_1 is the maximum refractive index of the core, n_2 is the refractive index of the homogeneous cladding adjacent to the core, n_3 is the defining refractive index, and m is a fraction, usually not greater than 0.05. [After 2196]

core-cladding offset: *See* **concentricity error**.

core diameter: In the cross section of a realizable optical fiber, ideally circular, but assumed to a first approximation to be elliptical, the average of the

diameters of the smallest circle that can be circumscribed about the core-cladding boundary, and the largest circle that can be inscribed within the core-cladding boundary.

core dump: A printout, usually in hexadecimal characters, of the contents of core memory. *Note:* A core dump is useful for analyzing an abnormally terminated computer run or finding bugs in a computer program.

core eccentricity: *Synonym* **concentricity error.** *See* **ovality.**

core noncircularity: *See* **ovality.**

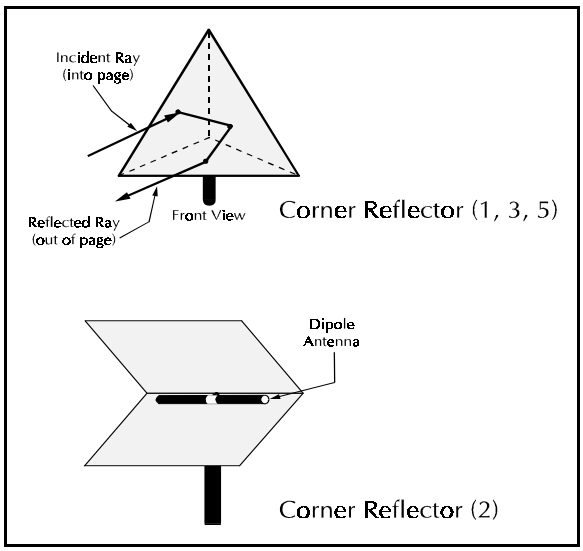
core storage: *See* **magnetic core storage.**

core-to-cladding concentricity: *Synonym* **concentricity error**.

core-to-cladding eccentricity: *Synonym* **concentricity error.**

core-to-cladding offset: *Synonym* **concentricity error.**

corner reflector: **1.** A reflector consisting of three mutually perpendicular intersecting conducting flat surfaces, which returns a reflected electromagnetic wave to its point of origin. (188) *Note:* Such reflectors are often used as radar targets. **2.** A directional antenna using two mutually intersecting conducting flat surfaces. **3.** A device, normally consisting of three metallic surfaces or screens perpendicular to one another, designed to act as a radar target or marker. [JP1] **4.** In radar interpretation, an object that, by means of multiple reflections from smooth surfaces, produces a radar return of greater magnitude than might be expected from the physical size of the object. [JP1] **5.** A passive optical mirror, that consists of three mutually perpendicular flat, intersecting reflecting surfaces, which returns an incident light beam in the opposite direction.



corner reflector

corner reflector antenna: (188) *See* **corner reflector (def #2).**

corrective maintenance: **1.** Maintenance actions carried out to restore a defective item to a specified condition. **2.** Tests, measurements, and adjustments made to remove or correct a fault. (188)

cosine emission law: *Synonym* **Lambert's cosine law.**

cosite: Collocation of electronic equipment on the same vehicle, station, or base. *Note:* Equipment so located is often subject to interference because of its proximity to other equipment.

cosmic noise: Random noise that originates outside the Earth's atmosphere. (188) *Note:* Cosmic noise characteristics are similar to those of thermal noise. Cosmic noise is experienced at frequencies above about 15 MHz when highly directional antennas are pointed toward the Sun or to certain other regions of the sky such as the center of the Milky Way Galaxy. *Synonym* **galactic radio noise.**

Costas loop: A phase-locked loop used for carrier phase recovery from suppressed-carrier modulation signals, such as from double-sideband suppressed carrier signals. *Note:* In the usual implementation of a Costas loop, a local voltage-controlled oscillator

provides quadrature outputs, one to each of two phase detectors, *i.e.*, product detectors. The same phase of the input signal is also applied to both phase detectors and the output of each phase detector is passed through a low-pass filter. The outputs of these low-pass filters are inputs to another phase detector, the output of which passes through a loop filter before being used to control the voltage-controlled oscillator.

Coulomb's law: The universal law of attraction and repulsion of electric charges.

counterpoise: A conductor or system of conductors used as a substitute for earth or ground in an antenna system. [From Weik '89]

country code: 1. In international direct telephone dialing, a code that consists of 1-, 2-, or 3-digit numbers in which the first digit designates the region and succeeding digits, if any, designate the country. **2.** In international record carrier transmissions, a code consisting of 2- or 3-letter abbreviations of the country names, or 2- or 3-digit numbers that represent the country names, that follow the geographical place names.

coupled modes: 1. In fiber optics, a mode that shares energy among one or more other modes, all of which propagate together. (188) [After 2196] *Note:* The distribution of energy among the coupled modes changes with propagation distance. **2.** In microwave transmission, a condition where energy is transferred from the fundamental mode to higher order modes. *Note:* Energy transferred to coupled modes is undesirable in usual microwave transmission in a waveguide.

coupler: *See* **directional coupler.**

coupling: The desirable or undesirable transfer of energy from one medium, such as a metallic wire or an optical fiber, to another like medium, including fortuitous transfer. (188) *Note:* Examples of coupling include capacitive (electrostatic) coupling, inductive (magnetic) coupling, conducted (resistive or hard-wire) coupling, and fiber-optic coupling.

coupling coefficient: A number that expresses the degree of electrical coupling that exists between two circuits. *Note:* The coupling coefficient is calculated as the ratio of the mutual impedance to the square root of the product of the self-impedances of the coupled circuits, all impedances being expressed in the same units.

coupling efficiency: In fiber optics, the efficiency of optical power transfer between two optical components. (188) [After 2196] *Note 1:* The transfer may take place (a) between an active component, such as an LED, and a passive component, such as an optical fiber, or (b) between two passive components such as two optical fibers. *Note 2:* Coupling efficiency is usually expressed as the ratio, converted to percent, of the input power, *i.e.*, the available power from one component, to the power transferred to the other component.

coupling loss: 1. The loss that occurs when energy is transferred from one circuit, circuit element, or medium to another. *Note:* Coupling loss is usually expressed in the same units—such as watts or dB—as in the originating circuit element or medium. (188) **2.** In fiber optics, the power loss that occurs when coupling light from one optical device or medium to another. [After 2196]

cover: The technique of concealing or altering the characteristics of communications patterns for the purpose of denying an unauthorized receiver information that would be of value. *Note: Cover* is a process of modulo two addition of a pseudorandom bit stream generated by a cryptographic device with bits from the control message. (188)

coverage: In radio communications, the geographical area within which service from a radio communications facility can be received.

CPE: *Abbreviation for* **customer premises equipment.**

cpi: *Abbreviation for* **characters per inch.**

cps: *Abbreviation for* **characters per second.** *Note: Formerly, abbreviation for* **cycles per second,** the unit used to express frequency. However, ***hertz***, an SI unit, is the proper unit for frequency.

CPU: *Abbreviation for* **central processing unit**. **1.** The portion of a computer that includes circuits

controlling the interpretation and execution of instructions. (188) **2.** The portion of a computer that executes programmed instructions, performs arithmetic and logical operations on data, and controls input/output functions. *Synonym* **central processor. 3.** *Abbreviation for* **communications processor unit.** The portion of a digital communications switch that executes programmed instructions, performs arithmetic and logical operations on signals, and controls input/output functions.

CR: *Abbreviation for* **channel reliability, circuit reliability.**

CRC: *Abbreviation for* **cyclic redundancy check.**

critical angle: In geometric optics, at a refractive boundary, the smallest angle of incidence at which total internal reflection occurs. (188) *Note 1:* The angle of incidence is measured with respect to the normal at the refractive boundary. *Note 2:* The critical angle is given by

$$\theta_c = \sin^{-1}\left(\frac{n_1}{n_2}\right) \quad ,$$

where θ_c is the critical angle, n_1 is the refractive index of the less dense medium, and n_2 is the refractive index of the denser medium. *Note 3:* The incident ray is in the denser medium. *Note 4:* If the incident ray is precisely at the critical angle, the refracted ray is tangent to the boundary at the point of incidence.

critical area: An operational area that requires specific environmental control because of the equipment or information contained therein. (188)

critical frequency: 1. In radio propagation by way of the ionosphere, the limiting frequency at or below which a wave component is reflected by, and above which it penetrates through, an ionospheric layer. (188) **2.** At vertical incidence, the limiting frequency at or below which incidence, the wave component is reflected by, and above which it penetrates through, an ionospheric layer. (188) *Note:* The existence of the critical frequency is the result of electron limitation, *i.e.*, the inadequacy of the existing number of free electrons to support reflection at higher frequencies.

critical service: *Synonym* **essential service.**

critical technical load: That part of the total technical power load required for synchronous communications and automatic switching equipment. (188)

critical wavelength: The free-space wavelength that corresponds to the critical frequency. *Note:* The critical wavelength is equal, in meters, to the speed of light (3×10^8 m/s) divided by the critical frequency in hertz.

cross assembler: An assembler that can run symbolic-language input on one type of computer and produce machine-language output for another type of computer.

cross-band radiotelegraph procedure: A radiotelegraph network operational procedure in which calling stations, such as ship stations, call other stations, such as shore stations, using one frequency, and then shift to another frequency to transmit their messages; the called stations answer using a third frequency.

crossbar switch: A switch that has a plurality of vertical paths, a plurality of horizontal paths, and electromagnetical means, *i.e.*, relays, for interconnecting any one of the vertical paths to any one of the horizontal paths. (188)

cross-connect: *Synonym* **cross-connection.**

cross-connection: Connections between terminal blocks on the two sides of a distribution frame, or between terminals on a terminal block. (188) *Note:* Connections between terminals on the same block are also called *"straps." Synonyms* **cross-connect, jumper.**

cross coupling: The coupling of a signal from one channel, circuit, or conductor to another, where it is usually considered to be an undesired signal. (188)

crosslink: A data link between two satellites. (188)

cross modulation: Intermodulation caused by the modulation of the carrier of a desired signal by an undesired signal. (188)

cross-office trunk: A trunk that has its terminations within a single facility. (188)

crosspoint: A single element that (a) is in the array of elements that compose a switch and (b) consists of a set of physical or logical contacts that operate together to extend the speech and signaling channels in a switched network.

cross-polarized operation: The operation of two transmitters on the same frequency, but with polarizations in the opposite sense, *e.g.*, plane polarization with one transmitter-receiver pair being vertically polarized and the other pair horizontally polarized. (188)

cross-site link: In a satellite communications system, the signal power and control connections between the components of an Earth station. *Note:* Examples of cross-site links are (a) links between transmitters and antennas and (b) links between control consoles and transmitters.

crosstalk (XT): 1. Undesired capacitive, inductive, or conductive coupling from one circuit, part of a circuit, or channel, to another. **2.** Any phenomenon by which a signal transmitted on one circuit or channel of a transmission system creates an undesired effect in another circuit or channel. (188) *Note:* In telephony, crosstalk is usually distinguishable as speech or signaling tones.

crosstalk coupling: The ratio of the power in a disturbing circuit to the induced power in the disturbed circuit observed at specified points of the circuits under specified terminal conditions. *Note:* Crosstalk coupling is usually expressed in dB. (188) *Synonym* **crosstalk coupling loss.**

crosstalk coupling loss: *Synonym* **crosstalk coupling.**

cryptanalysis: 1. Operations performed in converting encrypted messages to plain text without initial knowledge of the crypto-algorithm and/or key employed in the encryption. [NIS] **2.** The study of encrypted texts.

CRYPTO: [The] marking or designator identifying COMSEC keying material used to secure or authenticate telecommunications carrying classified or sensitive U.S. Government or U.S. Government-derived information. *Note:* When written in all upper case letters, CRYPTO has the meaning stated above. When written in lower case as a prefix, crypto and crypt are abbreviations for cryptographic. [NIS]

cryptochannel: A complete system of crypto-communications between two or more holders. The basic unit for naval cryptographic communication. It includes: (a) the cryptographic aids prescribed; (b) the holders thereof; (c) the indicators or other means of identification; (d) the area or areas in which effective; (e) the special purpose, if any, for which provided; and (f) pertinent notes as to distribution, usage, *etc*. A cryptochannel is analogous to a radio circuit. [JP1]

cryptographic information: All information significantly descriptive of cryptographic techniques and processes or of cryptographic systems and equipment, or their functions and capabilities, and all cryptomaterial. [JP1]

cryptography: 1. [The] principles, means, and methods for rendering plain information unintelligible and for restoring encrypted information to intelligible form. [NIS] **2.** The branch of cryptology that treats of the principles, means, and methods of designing and using cryptosystems.

crypto key: *Deprecated term. See* **key.**

cryptologic: Of or pertaining to cryptology. [JP1]

cryptology: The science that deals with hidden, disguised, or encrypted communications. It embraces communications security and communications intelligence. [JP1] (188)

cryptomaterial: All material including documents, devices, equipment, and apparatus essential to the encryption, decryption, or authentication of telecommunications. When classified, it is designated CRYPTO and subject to special safeguards. [JP1]

cryptonet: Stations that hold a specific key for use. *Note:* Activities that hold key for other than use, such as cryptologistic depots, are not cryptonet members

for that key. Controlling authorities are *de facto* members of the cryptonets they control. [NIS]

cryptosecurity: *See* **communications security.**

cryptosystem: Associated COMSEC items interacting to provide a single means of encryption or decryption. [NIS] (188)

crystal oscillator (XO): An oscillator in which the frequency is controlled by a piezoelectric crystal. *Note 1:* A crystal oscillator may require controlled temperature because its operating frequency is a function of temperature. *Note 2:* Types of crystal oscillators include voltage-controlled crystal oscillators (VCXO), temperature-compensated crystal oscillators (TCXO), oven-controlled crystal oscillators (OCXO), temperature-compensated-voltage controlled crystal oscillators (TCVCXO), oven-controlled voltage-controlled crystal oscillators (OCVCXO), microcomputer-compensated crystal oscillators (MCXO), and rubidium crystal oscillators (RbXO).

CSMA: *Abbreviation for* **carrier sense multiple access.**

CSMA/CA: *Abbreviation for* **carrier sense multiple access with collision avoidance.**

CSMA/CD: *Abbreviation for* **carrier sense multiple access with collision detection.**

CSU: *Abbreviation for* **channel service unit, circuit switching unit, customer service unit.**

C2W: *Abbreviation for* **command and control warfare.**

CTX: *Abbreviation for* **Centrex® service.**

cursor: A movable, visible mark used to indicate a position of interest on a display surface. *Note:* A cursor may have a controllable shape, such as an underline, a rectangle, or a pointer and usually indicates where the next character or graphic will be entered or revised.

curvature loss: *Synonym* **macrobend loss.**

curve-fitting compaction: Data compaction accomplished by substituting an analytical expression for the data to be stored or transmitted. *Note:* Examples of curve-fitting compaction are (a) the breaking of a continuous curve into a series of straight line segments and specifying the slope, intercept, and range for each segment and (b) using a mathematical expression, such as a polynomial or a trigonometric function, and a single point on the corresponding curve instead of storing or transmitting the entire graphic curve or a series of points on it.

customer access: In an Integrated Services Digital Network (ISDN), the portion of the ISDN access that a network provider supplies to connect the customer, *i.e.*, subscriber, installation to the network. *Note:* Customer access includes those network elements or portions of elements that extend from the access switch to the network interface.

customer management complex: In network management, a complex that (a) is controlled by a customer and (b) is responsible for, and performs, maintenance for the customer installation.

customer office terminal: 1. Termination equipment that (a) is located on the customer premises and (b) performs a function that may be integrated into the common carrier equipment. *Note:* An example of a customer office terminal is a stand-alone multiplexer located on the customer premises. **2.** The digital loop carrier (DLC) multiplexing function that is near the exchange termination (ET) when provided by a stand-alone multiplexer. *Note:* This function may be integrated into the ET.

customer owned and maintained equipment (COAM): *Deprecated term. See* **customer premises equipment.**

customer premises equipment (CPE): Terminal and associated equipment and inside wiring located at a subscriber's premises and connected with a carrier's communication channel(s) at the demarcation point *("demarc"). Note 1:* The demarc is a point established in a building or complex to separate customer equipment from telephone company equipment. *Note 2:* Excluded from CPE are over-voltage protection equipment and pay telephones.

customer-provided equipment: *Deprecated term. See* **customer premises equipment.**

customer service unit (CSU): A device that provides an accessing arrangement at a user location to either switched or point-to-point, data-conditioned circuits at a specifically established data signaling rate. *Note:* A CSU provides local loop equalization, transient protection, isolation, and central office loop-back testing capability.

custom local area signaling service (CLASS): One of an identified group of network-provided enhanced services. *Note:* A CLASS group for a given network usually includes several enhanced service offerings, such as incoming-call identification, call trace, call blocking, automatic return of the most recent incoming call, call redial, and selective forwarding and programming to permit distinctive ringing for incoming calls.

cutback technique: A destructive technique for determining certain optical fiber transmission characteristics, such as attenuation and bandwidth, by (a) performing the desired measurements on a long length of the fiber under test, (b) cutting the fiber under test at a point near the launching end, (c) repeating the measurements on the short length of fiber, and (d) subtracting the results obtained on the short length to determine the results for the residual long length. *Note 1:* The cut should not be made less than 1 meter from the launch end. However, cutting the fiber so close to the launch end (in a multimode fiber) will introduce errors in the measurements because at that point, modal equilibrium conditions have not been established. The errors so introduced will result in conservative results (*i.e.*, higher transmission losses and lower bandwidths) than would be realized under equilibrium conditions. *Note 2:* Several characteristics may be determined using the same test fiber. *Note 3:* A variation of the cutback technique is the substitution method, in which measurements are made on a full length of fiber, and then on a short length of fiber having the same characteristics (core size, numerical aperture), with the results from the short length being subtracted to give the results for the full length.

cutoff attenuator: A waveguide, of adjustable length, which varies the attenuation of signals passing through it.

cutoff frequency: **1.** The frequency either above which or below which the output of a circuit, such as a line, amplifier, or filter, is reduced to a specified level. (188) **2.** The frequency below which a radio wave fails to penetrate a layer of the ionosphere at the incidence angle required for transmission between two specified points by reflection from the layer. (188)

cutoff mode: The highest order mode that will propagate in a given waveguide at a given frequency. (188)

cutoff wavelength: **1.** The wavelength corresponding to the cutoff frequency. (188) **2.** In an uncabled single-mode optical fiber, the wavelength greater than which a particular waveguide mode ceases to be a bound mode. (188) *Note 1:* The cutoff wavelength is usually taken to be the wavelength at which the normalized frequency is equal to 2.405. *Note 2*: The *cabled* cutoff wavelength is usually considered to be a more functional parameter because it takes into consideration the effects of cabling the fiber.

cutover: The physical changing of circuits or lines from one configuration to another. (188)

CVSD: *Abbreviation for* **continuously variable slope delta modulation.**

cw: *Abbreviation for* **carrier wave, continuous wave.**

CX: *Abbreviation for* **composite signaling.**

cxr: *Abbreviation for* **carrier.**

CX signaling: *Synonym* **composite signaling.**

cyclic distortion: In telegraphy, distortion that (a) is periodic and (b) is not characteristic, not biased, and not fortuitous. (188) *Note:* Causes of cyclic distortion include irregularities in the duration of contact time of the brushes of a transmitter distributor and interference by disturbing alternating currents.

cyclic redundancy check (CRC): An error-detection scheme that (a) uses parity bits generated by polynomial encoding of digital signals, (b) appends those parity bits to the digital signal, and (c) uses decoding algorithms that detect errors in the received digital signal. *Note:* Error correction, if required, may be accomplished through the use of an automatic repeat-request (ARQ) system.

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